All-Hazards Pre-Disaster Mitigation Plan

El Paso County, Colorado

VERSION DATE: JUNE, 2008

El Paso County, Colorado
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This Plan encompasses the Colorado jurisdiction of:

El Paso County, Colorado
Unincorporated El Paso County

In a Coordinated Effort with:

Municipalities
Palmer Lake
Monument
Manitou Springs
Green Mountain Falls
Fountain
Calhan
City of Colorado Springs

This PDM was also coordinated with the military installations within the County to ensure a unified effort

This report encompasses the best efforts of the plan's participants to comply with guidance from the State of Colorado, Division of Emergency Management, and the Federal Emergency Management Agency. It is also understood and acknowledged by all participants that the disaster mitigation planning process is dynamic and requires periodic review, analysis and amendment.

Individual Acknowledgements

A special thank you is given to the individuals listed below whom enthusiastically gave of their time and resources to assist in the development of the El Paso County PDM Plan. The individuals below provided strategies, goals, objectives, activities and other information needed to put together this PDM Plan. These individuals helped focus the project on those hazards that present the most risk for El Paso County.

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Executive Summary

The Pre-Disaster Mitigation (PDM) Plan is a requirement of the Disaster Mitigation Act of 2000. There are federal financial benefits to completing the PDM Plan, having it approved by the Federal Emergency Management Agency (FEMA) and sustaining as well as maintaining the Plan for the future.

The El Paso County area has endured several major disasters over the past 150 years. These include flooding, wildfire and many large damaging events from severe weather. There is no certainty that subsequent disasters will be equal, less or greater than the magnitude of previous disasters. As the County continues to grow, the consequences from a major disaster are exponentially increasing.

FEMA initiated the Pre-Disaster Mitigation Program to further the institutionalizing of processes and programs at the state and community level and facilitate the identification of additional activities that should be undertaken to reduce future disaster losses and improve the disaster resistance of local communities.

Various natural disasters are inherent to the geographic area. While natural disasters cannot be avoided, measures can be taken to reduce their effect as well as reduce the time and resources required for response and recovery.

Mitigation and preparedness are an insurance policy that can never provide all the protection that is needed. Officials of the County and its enterprises, other stakeholders and the public must have a clear vision of the potential consequences and a commitment to providing sufficient resources to long-term programs that sustain and improve disaster preparedness. All stakeholders must share responsibility for reducing the risks in an open and trusting environment.

The most important point that can be gleaned from this document is that pre-disaster mitigation is a continuous process. The County is dedicated to a sustained effort to improve its disaster resistance. This entails long-term commitments and long-term resource allocation to programs and entities that improve the County's disaster resistance. Without a long-term persistent effort the County is at risk for future disasters to include those with catastrophic losses.

The 3 hazards (wildfire, HAZMAT spills, and severe weather) are the disasters that are most likely to affect the County. Colorado Springs, military installations and the municipalities within El Paso County were very generous in providing information in the development of the PDM Plan for Unincorporated El Paso County.

The following goals and objectives were identified through the planning process. Actions are listed in Appendix A of this document under Mitigation Goals, Objectives, and Actions.

Goal: Reduce the probability and effect of a catastrophic Wild Land Fire

Objective: Identify those areas of the County that require WLF fuels mitigation efforts and establish programs to reduce fuel loading in those areas.

Objective: Improve the ability of First Responders to reach WLF and improve their ability to fight the fire.

Objective: Improve the ability of residents to prevent fires.

Goal: Reduce the probability of a HAZMAT release and reduce the impact to residents should a release take place.

Objective: Identify and characterize the facilities and roads utilized for HAZMAT transportation and storage to ensure quick and safe response actions.

Objective: Provide for improved response by the public in case of a HAZMAT release.

Goal: Minimize the impact of severe weather to County residents.

Objective: Upgrade and expand the flood warning system within the County to include new residential areas that are in in a designated drainage basin..

Objective: Reduce the effects of flooding and its impact on residents, businesses, agriculture, infrastructure, and natural areas.

Objective: Improve tornado warning in rural areas of the county especially in high tornado- prone areas.

Goal: Reduce the rockslide/mudslide occurrences and impact potential to residents and their property.

Objective: Identify, characterize mudslide/landslide prone areas and mitigate effects to residents.

Goal: Reduce the potential and impact of a severe act of violence in County schools or on school buses.

Objective: Reduce the ability of unauthorized persons to access schools and cause a severe act of violence in County schools.

Objective: Improve the ability to locate school buses and provide for a quick response for emergencies.

Objective: Improve First Responders ability to respond to school emergencies. This includes the designing of new buildings to support response operations.

Objective: Improve the ability of teachers and school staff to act and react to acts of violence.

Goal: Reduce disease outbreak occurrences and severity in the County

Objective: Provide for public education to increase awareness on how to prevent or minimize disease outbreak.

Objective: Improve the County's ability to respond to a potential or actual disease outbreak.

Goal: Insure continuity of critical services in the County

Objective: Protect Critical Infrastructure from All-Hazard.

Introduction

The purpose of the Pre-Disaster Mitigation (PDM) Plan is to comply with the Disaster Mitigation Act of 2000 and establish a policy and blueprint to institutionalize existing and new programs, processes and procedures to continuously reduce potential disaster losses and sustain this effort in future years. There are positive federal financial incentives for those PDM Plans approved by FEMA and the State.

It is only a question of time before another major natural disaster strikes the County. While smaller storms and smaller disasters will continue to occur on a periodic basis, a large disaster will eventually occur and the consequences of not being prepared are severe. The risk is great enough that within the County a large flood or wildfire, if it occurred today, can result in a significant loss of property and life and jeopardize the economic foundation of the region.

Historical evidence is a compelling argument that future natural disasters will occur in such a magnitude that external assistance will be required to respond and recover from these disasters.

As an example of the severity of a major disaster, compare the 1935 Flood with the 1999 Flood. The National Weather Service reported in a summary of 19th century weather that Fountain Creek, south of Colorado Springs, was 6 feet above normal during the 1999 storm. During the 1935 Flood, Monument Creek and Fountain Creek were estimated at 22 feet and 20 feet above normal, respectively. If the 1935 Flood were to occur today, losses in infrastructure, property and human lives, as well as other consequences, could bring the County and Colorado Springs to a standstill and cost billions of dollars.

The recent drought and lack of major storms is a false sense of security. These disaster voids provide opportunities for improving the disaster resistance of the County and municipalities within the County. By the same token they provide opportunities for complacency and self-denial. Preparedness for natural disasters requires constant vigilance and constant preparation.

Time and again communities have short memories and as a result natural disasters wreak havoc when they strike. Too often, only in the immediate aftermath of a disaster, does the community relearn the lessons from a previous disaster. Unfortunately, the costs to the community can be far greater than if proactive measures had been taken in advance of the disaster.

This PDM Plan provides a foundation upon which subsequent efforts can build upon in a continuous commitment to effective pre-disaster mitigation.

It is critical that an educational program continuously educate the public on potential disasters in a variety of forums and through multi-media means. This component is essential to making the public aware, sustaining the awareness and facilitating other proactive measures needed to reduce the exposure to disaster losses.

The 3 hazards (wildfire, large HAZMAT spill and severe weather) discussed in this plan are in general the disasters that are most likely to affect the County and the ones that experts and officials agree may impact the County the most. Severe weather includes lightning, hail, floods, tornadoes, winter storms (snow, ice, etc.), high wind and other types of hazardous phenomena.

One of the keys to preparedness is advance mitigation as part of comprehensive programs that operate over time. Each year these programs improve the disaster resistance of the community. This requires that adequate resources be made available on a steady and consistent basis to those tasks and activities that reduce disaster losses and ensure public safety.

El Paso County has integrated a number of mitigation measures into existing County processes and programs.

There are a number of on-going initiatives that were already underway before the PDM Plan became a requirement. The PDM Plan's intent is to create or reemphasize awareness by all stakeholders, sustain and improve existing beneficial programs, initiate additional preparedness and mitigation actions in a comprehensive manner, take positive steps to reduce future disaster losses and ensure the framework for success is put in place and or sustained. The Plan:

1. Establishes a framework for reducing future disaster losses.
2. Helps prepare for, mitigate, avoid, reduce and minimize the disruption, damage and losses that occur from a disaster.
3. Sustains existing programs that improve the County's disaster preparedness.
4. Encourages public participation.
5. Documents hazards, risk assessments, and vulnerabilities.
6. Defines a strategy with goals and objectives for long-term and comprehensive mitigation measures and activities.
7. Institutionalizes the programs and processes needed to implement, sustain and improve disaster preparedness, mitigation measures, and the PDM Program
8. Creates additional benefits such as:
    a. Improving the Community's ability to respond and recover,
    b. Improving public safety and
    c. Improving the capabilities of emergency services.

The PDM Plan highlights the importance of preparedness and mitigation and provides an incentive so that the local community and its leaders begin to understand what policies, programs and other measures are already in place and to take action to adopt additional measures and programs that enhance the disaster preparedness of the community. It is critical to ensure that there is a concerted and dedicated effort towards continually reducing disaster losses. As part of the PDM process the local community is encouraged to participate in the process.

With time this Plan can be further developed to include more details for all topics that belong in the Plan and serve as a more comprehensive document for the community. One of the desired outcomes of the PDM Plan and the ensuing process is that the County, in a collaborative and comprehensive manner, moves forward and ensures that disaster preparedness and mitigation remain priorities. An additional outcome is that the community and its leaders do not lose sight of the fact that future disasters will occur and there are significant risks that must be recognized and addressed.

It is recognized that various natural disasters are inherent to the geographic area. While natural disasters cannot be avoided, measures can be taken to reduce their effect, as well as, reduce the time and resources required for response and recovery. It is in the best interest of El Paso County citizens that pro-active measures are taken to continuously improve the disaster resistance of the community and take other measures to mitigate, avoid or reduce the risk as well as facilitate a timely response and recovery.

This PDM Plan provides a foundation upon which subsequent efforts can build upon as resources permit. It also presents a common thread for many tasks, activities, and functions that cross intra- and inter-jurisdiction boundaries.

DISASTER MITIGATION ACT OF 2000

To assist the States and Nation in recovering from disasters, the U.S. Congress passed the Robert T. Stafford Disaster Relief, and to encourage States to conduct mitigation efforts to reduce the impact of disasters they enacted the Emergency Assistance Act also known as the Disaster Mitigation Act of 2000 (DMA 2000). With this legislation the Federal government has placed renewed emphasis on pre-disaster mitigation of potential hazards. Most relevant to state and local governments under the DMA 2000 are its amendments to Sections 203 (Pre-Disaster Hazard Mitigation) and 322 (Mitigation Planning).

Section 203 of the DMA 2000 establishes a "National Pre-Disaster Mitigation Fund" to support a program that will "provide technical and financial assistance to state and local governments to assist in the implementation of pre-disaster hazard mitigation measures that are cost-effective and designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities under the jurisdiction of the state or local governments."

Section 322 of the DMA 2000 provides a new and revitalized approach to mitigation planning by:

- Establishing a requirement and delivering new guidance for state, local and tribal mitigation plans;
- Providing for states to receive an increased percentage of Hazard Mitigation Grant Program (HMGP) funds (from 15 percent to 20 percent) if, at the time of the declaration of a major disaster, they have in effect an approved State Mitigation Plan that meets criteria defined in the law; and
- Authorizing up to seven percent (7.0%) of the HMGP funds available to a state to be used for development of state, local and tribal mitigation plans.

PURPOSE, GOALS AND OBJECTIVES

The purpose of the Plan is to identify hazards, identify the probability of their occurrence, and identify methods and/or procedures that could be utilized to reduce the occurrence of a disaster and if such disaster occurs to reduce the impact to people and property.

The critical element of this Plan is a set of recommended pre-disaster mitigation actions that minimize or help reduce the potential negative impacts caused by the identified hazards. Specific goals and objectives have been established to deliver measurable benefits to the County through mitigation actions that have been justified and prioritized using accepted practices and the methodology described in this document. El Paso County has formally adopted this Plan and established a process to periodically evaluate and modify its goals, objectives and mitigation actions as part of ongoing Plan maintenance.

The following are the Goals of this PDM:

- Protect life, safety and property by preventing future damages and economic losses that result from natural and human-caused hazards;
- If prevention methods fail, reduce the impact on residents of both natural and man made disasters

- Support future grant requests for pre- and post-disaster initiatives;

- Speed recovery, including economic recovery, and redevelopment following future disaster events;
- Demonstrate El Paso County's commitment to hazard mitigation principles; and
- Comply with federal and state legislation and guidance for local hazard mitigation planning
- Provide outreach and educational programs that will increase the awareness, knowledge and preparedness of residents in the County, which may reduce the loss of life and property caused by a disaster.

SCOPE OF THE PLAN

The Plan is focused on those hazards determined to pose high and moderate risk as indicated by El Paso County's risk assessment. Priority is given to hazards with greater potential to affect life, health and safety, impact emergency response capability or create distress to property and critical infrastructures within El Paso County.

El Paso County carefully considered a variety of natural hazards and human-caused threats pursuant to the compilation of this plan, and the hazards and mitigation actions detailed herein are those prioritized by the County and its plan partners. Future iterations of the Plan will re-evaluate hazards and, if appropriate, prioritize new hazards and develop associated potential mitigation actions documented in updated versions to the Plan.

AUTHORITY

The Plan is developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans, including:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390);
- FEMA's Interim Final Rule published in the Federal Register on February 26, 2002 at 44 CFR Part 201; and
- The State of Colorado, Department of Emergency Management, Office of the Governor.

The Plan will be monitored and revised periodically in accordance with legislation and rules covering mitigation planning and as described in a subsequent section of this document.

PLAN REFERENCES

The following references were utilized in the drafting of this PDM:

- El Paso County Emergency Operations Plan
- El Paso County Wildland Fire Response Plan
- El Paso County Hazardous Material Response Plan
- Colorado Springs Emergency Operations Plan

- Colorado Springs Wildland Fire Mitigation Plan
- Rampart Dam Emergency Action Plan
- North and South Catamount Dam Emergency Action Plan
- Crystal Creek Dam Emergency Action Plan
- Big Tooth Dam Emergency Action Plan
- Lake Moraine Dam Emergency Action Plan
- Nixon Dam Emergency Action Plan
- Fountain Creek Watershed Plan (http://www.fountain-crk.org)
- El Paso County Water Authority Water Report
- State of Colorado Natural Hazards Mitigation Plan 2007
- Regional Building Code 313 (Floodplain Code)

PLAN ORGANIZATION

The Plan follows a format consistent with those adopted by FEMA and the State of Colorado. The Plan includes sections covering:

- Project Planning and Methodology
- Community Profile
- Hazards in El Paso County
- Risk Assessment
- Hazard Mitigation
- Plan Maintenance and Adoption
- Appendices

Project Planning and Methodology

This section describes the hazard mitigation planning process undertaken by El Paso County as well as the framework for continuous Plan improvement. El Paso County is subject to a variety of human-caused and natural hazards. The occurrence of, and impact of, these hazards vary within the County and are based on location, geography, weather patterns, location of transportation lines, demographics and economic base. As a result, El Paso County has implemented this planning methodology using recognized best practices, guidance from FEMA and the Colorado Department of Emergency Management and input from the private sector and El Paso County's respective constituents and emergency services professionals. Topics in this section include:

- The planning team and the project charter process
- Plan coordination and team meetings
- Hazards identification and prioritization
- Risk determination and impact on critical infrastructure
- Identification and selection of mitigation strategies
- Implementation of mitigation strategies
- Plan maintenance and updates

This Plan is developed to meet requirements under the Disaster Mitigation Act of 2000 (DMA 2000). Although the DMA 2000 mandates mitigation planning for natural disasters only, El Paso County has elected to include manmade hazards such as Hazardous Material (HAZMAT) and terrorist issues into its planning model. El Paso County understands that planning for human-caused hazards will also serve to increase overall preparedness and an All-Hazards approach to its planning and response efforts.

THE PLANNING TEAM

Project participants

This Plan is developed using input from a cross-functional set of project participants representing El Paso County. Notwithstanding the expertise available, El Paso County recognizes that the dynamic nature of this project and targeted project deadlines require additional planning resources. As listed in the following tables, the project's Pre-Disaster Mitigation Plan (PDMP) Working Group (herein referred to as the Working Group) consisted of individuals representing El Paso County and their respective communities. Although this Plan only applies to the unincorporated areas of the county, the applicable area touches and borders the 6 municipalities as well as the 5 military installations within the County. For this reason personnel from these towns and installations were included in the planning effort to ensure a unified effort throughout the County. The project approach involved community residents, community officials, including emergency response professionals, and representatives from the private and nonprofit sector. The Working Group considered guidance from FEMA and interviewed a variety of stakeholders to ensure the best possible cross-section of project participants. As this planning process continues, El Paso County intends to broaden participation to improve plan quality. Below are the representatives that were involved in the planning effort.

El Paso County and Participating Jurisdictions	
Project Participant	**General Project Role**
El Paso County	
Emergency Manager and Emergency Preparedness Planner, El Paso County	• El Paso County Project Manager and sponsor for, and attendee of, regular project meetings • Coordinate subject matter expertise on mitigation planning • Review and approve public survey • Coordinate hazard identification and prioritization • Coordinate identification of critical infrastructure • Support the risk assessment and identification of mitigation options and recommendations • Collection of existing emergency and mitigation plans • Coordinate public hearings for plan review
Army Corps of Engineers / Fountain Creek Watershed Technical Advisory Committee	• Attend and support project kickoff meeting • Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Director, Geographical Information Systems, El Paso County	• Attend and support project kickoff meeting • Provide land use information as available
HAZMAT Response Chief, El Paso County	• Attend and support project kickoff meeting • Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Department of Transportation, El Paso County	• Attend and support project kickoff meeting • Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Storm Water Coordinator, El Paso County	• Attend and support project kickoff meeting • Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Sheriff, El Paso County	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions • Review draft documents
Flood Plain Engineer, Pikes Peak Region	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions • Review draft documents
Dam Engineer, State Of Colorado	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions • Review draft documents
Meteorologists, National Weather Service	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions • Review draft documents
Wildland Risk Management, Colorado Springs Fire Dept	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions • Review draft documents
Town Of Monument	
Chief, Monument Police Department	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Town of Calhan	
Fire Chief, Calhan Fire Protection District	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Town of Fountain	
Chief, Fountain Police Department	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Town of Green Mountain Falls	

El Paso County and Participating Jurisdictions	
Project Participant	**General Project Role**
El Paso County	
Fire Chief, Green Mountain Falls	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions
Town of Manitou Springs	
Chief, Manitou Springs Police Department	• Provide hazard identification and analysis support • Analysis of hazard mitigation actions

El Paso County is the home to several military installations. Any disaster that would affect El Paso County will most likely also affect some or all of these military installations. It is also assumed that any disaster will affect military personnel as the majority of these personnel reside outside the military installations but within the County. Listed in the following table below are the military representatives that reviewed this plan to ensure a coordinated effort between the County's efforts and efforts on each military installation.

Military Installations Contributing to the PDMP Development	
Project Participant	**General Project Role**
Emergency Management Director, US Air Force Academy	• Provide hazard identification and analysis support • Reviewed plan
DPTM, Fort Carson	• Provide hazard identification and analysis support • Reviewed plan
Commander and Readiness Officer, 21st Mission Support Group, Peterson Air Force Base	• Reviewed plan

Community participation

El Paso County recognizes that its community members provide valuable input and insight to the hazard mitigation planning process. The methodology used in developing this Plan maximized public involvement by utilizing a variety of informational resources and survey techniques. Public comment was collected through both surveys and interviews to expand the potential for broader public participation. The majority of public comment was obtained through the Sheriff's Community Emergency Response Volunteer Team members. There are currently 658 (Citizen Emergency Response Training) CERT members that support the El Paso County Sheriff's Office and each of these members was afforded an opportunity to provide input. These members provide a representative cross section of residents across the county. As part of this survey process, the Working Group also collected input from professionals in emergency management, fire services, medical and health services, law enforcement, planning, education, airport management, government administration, community development, transportation, utilities, and others in public and private sectors.

The community's opinions of the hazards most threatening to their environment were one of several criteria that was used to identify and prioritize hazards and direct mitigation efforts. Public involvement also helped determine critical infrastructures subject to hazard impact. Sample survey form is attached to the Plan as Appendix B.

PROJECT INITIATION AND TEAM COORDINATION

Initial planning began April 20, 2001 under a Grant that provided for the initiation of Project Impact. Project Impact provided for the initial hazard risk assessment for El Paso County and its municipalities. Subsequently this risk assessment was updated in 2006 and again in 2007 through a South Central Region (SCR) contract.

HAZARD IDENTIFICATION

The United States is vulnerable to a wide variety of natural hazards that threaten life and property, including damage to critical facilities and disruption of vital services. Furthermore, continuing local and national events establish that risks exist from human-caused hazards ranging from accidents to domestic and international terrorism. The planning team considered a comprehensive list of hazards and used the 2007 SCR risk assessment to prioritize certain hazards for mitigation actions on a jurisdictional basis.

THE RISK ASSESSMENT

During 2006 the South Central All-Hazards Region contracted for the completion of a Strategic Plan as well as an All-Hazards Regional Emergency Operations Plan. In the process of creating these documents a risk assessment was completed for each of the 5 counties within this All-Hazards Region. This included a complete risk assessment for El Paso County. The result of this risk assessment is included in this Plan at Appendix C.

The overall PDMP assessment was conducted to analyze hazards, determine loss estimates and establish a rational, supportable basis for selection of mitigation actions. The risk assessment encompassed these activities:

- Public input - Using community surveys discussed previously in this section, citizens provide input on hazards and hazard impact within the planning area.
- Risk assessment – Based on Subject Matter Experts (SMEs) of local emergency services professionals, as well as SMEs provided under contract with the South Central Region, hazards were ranked and impact estimated.
- Identification of critical infrastructure – Critical infrastructure within the planning area was evaluated for hazard susceptibility, damage or loss expectancy, and impact to government offices and the public.

The results of these activities allowed El Paso County to identify and profile hazards affecting it. The planning team used this information to determine vulnerabilities and provide the factual basis for the mitigation actions selected.

REVIEW OF CURRENT PLANS, STUDIES AND REPORTS

To validate potential mitigation options and to coordinate outcome from the Plan with existing mitigation strategies and plans, the Working Group reviewed hazard studies, emergency planning reports, and other documents currently covering prioritized hazards within El Paso County. These existing plans and documents reviewed are summarized in the Hazard Mitigation section of this document.

MITIGATION PLANNING

The risk assessment process identified hazards considered a priority within El Paso County, and the Working Group developed and documented goals and objectives to guide mitigation planning efforts. The team also developed and evaluated strategies for implementing justified and prioritized mitigation actions.

The El Paso County PDMP Working Group conducted research, reviewed county plans and interviewed experts to collect potential mitigation actions for prioritized hazards. In order to identify, select, and implement the most appropriate mitigation measures for El Paso County the Group examined general mitigation goals and objectives, local and state resources for implementation, as well as the merits of each potential mitigation measure. The Group then

evaluated and prioritized mitigation options according to the STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) methodology to determine the following:

-- Which mitigation measures are most appropriate for the types of risks El Paso County faces?
-- Does El Paso County have sufficient capabilities to implement these measures and what kind of assistance might be needed?
-- What impact will the implementation of these measures have on the County as a whole?

Potential mitigation actions and strategies were evaluated using the FEMA-recommended STAPLEE methodology, which seeks to identify options acceptable and appropriate for the community. Mitigation alternatives also included a cost-benefit analysis to determine the most economically viable solutions. The results of this process defined the mitigation actions included with the plan.

Implementation strategies for prioritized mitigation actions were developed at a strategic level to guide follow-on planning efforts. All targeted mitigation strategies were assigned points of contact within El Paso County.

PLAN MAINTENANCE AND ADOPTION

El Paso County will periodically review the plan and determine whether any significant changes have occurred requiring modifications to proposed mitigation actions and the Plan document. As discussed in the Plan Maintenance section of this document, the Working Group has selected specific timeframes and criteria and assigned roles for Plan review and update. Public input is important to the development and maintenance of the plan, and El Paso County will continue to seek input from a variety of sources, including residents. Significant modifications to the Plan also necessitate adoption by the appropriate governing bodies within the County.

Community Profile - El Paso County, CO

GENERAL COUNTY OVERVIEW

El Paso County is approximately 50 miles south of Denver and includes portions of the Rocky Mountains as well as the western plains. The County is the most populous county in the state and is an area twice the size of Rhode Island with 2,126 square miles (US Census Bureau 2000) and includes mountainous terrain in the western portion and prairie or plains in the eastern sector. The elevation of the County varies from the top of Pikes Peak (14,110 feet) to Black Squirrel Creek on the southern county line at 5,095 feet. The majority of the county land area is unincorporated.

El Paso County is urban along the Interstate 25 corridor but primarily rural elsewhere. This urban area contains an extremely large Wildland Urban Interface (WUI) with an estimated 36,000 homes in the WUI. There are a number of small communities and incorporated towns within the County, as well as one large city. The city is Colorado Springs at an elevation of 6,035 feet above sea level and it is the second largest city in the state. Colorado Springs has an estimated population of 403,000. The city accounts for approximately 70 per cent of the county's population of approximately 575,850 (State of Colorado estimates since the 2000 census). There are 5 other municipalities that include Monument, Calhan, Green Mountain Falls, Manitou Springs, and Fountain. There are numerous population centers in the unincorporated area of the county that include, Palmer Lake and Black Forest to the north; Security and Widefield to the south; Cascade and Chipita Park to the west, and Peyton, Falcon, and Ellicott to the east. There are also 5 military installations that are Schriever Air Force Base, Peterson Air Force Base, Fort Carson, Cheyenne Mountain Air Station, and the U.S. Air Force Academy. The County has a growth rate that is above the national average, which accounts for the rapid population growth in the unincorporated areas of the County. Additionally, Fort Carson will increase in population between 2007 and 2010 by approximately 20,000 personnel.

The County contains major north-south transportation routes, which are Interstate 25 as well as a major rail line (Burlington Northern Santa Fe/Union Pacific). These transportation routes are also major transportation routes for extremely hazardous material including Type III radiological material. Highway 24 is also a major HAZMAT route into the mountain communities that have major mining operations. Materials such as quick lime and hydrogen cyanide are routinely transported on this highway. HAZMAT spills in the County have increased with the population with a doubling of call-outs each year for the last three years. Additionally, the number of facilities and businesses that maintain reportable levels of HAZMAT has significantly increased over the last three years with a total of 66 reporting in 2007. The County's HAZMAT Team is an all-volunteer unit with an average of 25 personnel assigned. The unit is currently a Type II unit with a response time of approximately 30 to 60 minutes.

The County is supported by 25 Volunteer Fire Districts and Departments and a volunteer wildland fire team that have an average response time of 30 minutes. The county has suffered from a 10 year drought resulting in a majority of the county area being classified as high risk for devastating wildland fires. In the recent Colorado College "State of the Rockies" Report, El Paso was rated #10 in an 8 state region for susceptibility to Wildland/Urban Interface (WUI) Fire. El Paso County was the only county in Colorado to make this unfortunate list. In 2006 the County set a 90-day record for wildland fires. The lack of County-wide fire ordinances has allowed for several large communities to be established without appropriate fire fighting resources. Several fire departments are stretched to their limit and in some cases severely undermanned with firefighters. Many communities have insufficient cisterns that would allow for the quick transport or access to sufficient water to fight fires. Only 10% of the County is supported by hydrants.

Severe weather is commonplace in El Paso County. Of primary concern are the severe thunder/lightning storms that start fires and create flash flood conditions; snowstorms that create 14 foot drifts, and tornadoes that frequent the eastern part of the county. The County's meteorological classification is semi-arid alpine desert with approximately 250-285 days of sunshine and 15-16 inches of precipitation per year. Humidity is very low, typically in the single digits or in the teens. These conditions provide for an intense wildland fire season, yet the periodic flash floods can menace many of the creeks that have had minimal mitigation completed.

Crime is on the increase corresponding to the increase in population. The quick increase in population has also created a challenge for the law enforcement community. Since 1990 the rural population has increased 50%, police calls have increased by 137%, violent crimes have increased 31% in just the last year, yet the county has not funded a single additional deputy since 1990. This has resulted in a safety issue for law enforcement officers, which was unfortunately highlighted with the line-of-duty deaths of two police officers in 2006 alone. Violence in the schools is also increasing. Although the County has been fortunate to avoid any active shooting or kidnapping situations there have been cases of e-mail threats as well as a pipe-bomb threat that was stopped before two students involved could utilize them.

DEMOGRAPHICS

El Paso County has one of the lowest tax rates in the state with a .8 mill levy. This has been a large draw for new businesses and residents, which has resulted in a 10% population growth over the last five years. The result is that it is the most populous county with 575,851 residents. This huge influx of people has caused the housing market to rise significantly over the last 5 years. Approximately 70% of the population is within Colorado Springs; the remaining 30% is located in unincorporated areas or in small municipalities with populations less than 22,000. A large number of lower income families live in the rural areas and on the south and east side of Colorado Springs. An estimated 14,000 families are living below the poverty level, 9,000 are developmentally disabled, and 46,000 senior residents reside in the county. A large number of families that live in the unincorporated areas live in moble homes, many of which are pre-1976 (prior to 1976 there were no fire code requirements for trailer homes).

As of the census[2] of 2000, there were 516,929 people, 192,409 households, and 133,916 families residing in the county. The population density was 94/km² (243/mi²). There were 202,428 housing units at an average density of 37/km² (95/mi²). The racial makeup of the county was 81.19% White, 6.51% Black or African American, 0.91% Native American, 2.53% Asian, 0.24% Pacific Islander, 4.70% from other races, and 3.91% from two or more races. 11.30% of the population were Hispanic or Latino of any race.

There were 192,409 households out of which 36.70% had children under the age of 18 living with them, 55.60% were married couples living together, 10.20% had a female householder with no husband present, and 30.40% were non-families. 23.90% of all households were made up of individuals and 6.10% had someone living alone who was 65 years of age or older. The average household size was 2.61 and the average family size was 3.11.

In the county the population consisted of 27.60% under the age of 18, 10.50% from 18 to 24, 32.50% from 25 to 44, 20.70% from 45 to 64, and 8.70% who were 65 years of age or older. The median age was 33 years. For every 100 females there were 100.90 males. For every 100 females age 18 and over, there were 98.80 males.

The median income for a household in the county was $46,844, and the median income for a family was $53,995. Males had a median income of $35,940 versus $26,252 for females. The

per capita income for the county was $22,005. About 5.70% of families and 8.00% of the population were below the poverty line, including 10.00% of those under age 18 and 6.90% of those age 65 or over.

HISTORY

In 1861, a bill to create Colorado Territory was passed and President Lincoln appointed William Gilpin as the state's first territorial governor. The population of Colorado in 1861 was 21,000. The first legislature, sitting in Denver, selected Colorado City (west of present day Colorado Springs) as the capitol. The second legislature met there only a few days, in 1862, and adjourned to Denver. The assembly met in Denver and Golden up to 1867 when Denver was named the permanent seat of the territory. In 1876 - fifteen years after becoming a territory - Colorado was admitted as the thirty-eighth state in the union. Colorado was called the "Centennial State" in honor of the one-hundredth year of the Declaration of Independence.
Gold was discovered in nearby Cripple Creek in 1891. Historians estimate that approximately 50,000 people came to Colorado in search of gold in 1858-59. The golden years lasted until 1917, when the U.S. went to silver for its coinage and the local economy once again emphasized tourism. With the start of World War II, Fort Carson was established on 137,000 acres to the south of Colorado Springs. The military's presence grew in the 1950s with the opening of the U.S. Air Force Academy. Over the next 35 years, Peterson Air Force Base, Cheyenne Mountain Air Force Station and Schriever Air Force Base were established within the County.

With the establishment of the United States Space Command in the county, a large commercial market was created for the space industry. With this industry came a large influx of people and businesses into El Paso County specifically aimed at the government's Space industry. In 1986 the Space Shuttle Challenger exploded during the initial launch phase with the subsequent ceasing of space launch for several years. This created a severe impact on the economy of El Paso County with a large number of businesses closing and numerous residents defaulting on home loans. It was not until 1992 that economic recovery took a foothold. Today, US Northern Command has replaced US Space Command (moved to Omaha, NE) with an extremely large number of Homeland Security businesses opening to support this new command. With 5 military installations located in the county the economics of the area is highly dependent on military contract jobs. Additionally, computers, electronic equipment, semiconductors, precision parts, plastics, equipment and countless other high-quality products are manufactured in the Pikes Peak region and shipped to national and international markets.

Currently El Paso County is the most populous of the 65 counties in the State. It is estimated that the county population was 576,884 in 2006, an 11.60% increase since U.S. Census 2000. This increase in population occurs mostly in the unincorporated areas of the county. From 1992 until approximately 2004 residential and commercial property trends included extensive development in the urban wildland interface and along the I-25 and State Highway 24 corridors. This has significantly increased the risk from wildfire and HAZMAT spills and places a significant demand on emergency planning and response resources. From 2004 until today the majority of new residential areas are developing east of Colorado Springs as well as to the north and south.

El Paso County is a highly popular winter and summer recreation destination. It features uncrowded trails, numerous creeks for fishing, Pikes Peak and numerous recreational opportunities including all snow sports, mountain climbing, skating, ice fishing, hunting and, in the summer, golf, hot air balloon rides, boating, camping and more. El Paso County is home to the spectacular beauty of the Pike National Forest. Elk, moose, deer, and bighorn sheep are frequent autumn visitors on the various roads and trails.

TOWNS

The region addressed in this plan is comprised of the following towns: Calhan, Fountain, Green Mountain Falls, Manitou Springs, Monument and Palmer Lake. This area also contains portions of Pikes Peak National Forest.

The Pikes Peak National Forest is comprised of 1,110,482 acres located in the Front Range and Mosquito Mountains. Located within a short drive of metropolitan areas, the forests are frequented by Colorado visitors, as well as residents. The National Forest encompasses the upland watersheds for the North and South Platte River systems. These systems provide water for the metropolitan areas along Colorado's Front Range.

Calhan

The town of Calhan has an elevation of 6,535 feet and a total area of .7mi^2. According to the 2000 Census, there were 896 people, 347 households and 246 families residing in the town. Terrain in Calhan is generally flat with prairie type vegetation making it susceptible to wildland fires fueled by high winds in the area. Calhan also lies in El Paso County's tornado-prone area that is highly susceptible to tornadoes and microbursts. Historically, El Paso County experiences the 5th largest number of tornadoes in the State, and most hit in the vicinity of the area around, east and south of Calhan.

Fountain

The city of Fountain is located 10 miles south of Colorado Springs along Interstate-25 and situated at the base of Pikes Peak, part of the rugged Rocky Mountain Range. Elevation is 5,546 feet and the city of Fountain has a total area of 14mi^2. There were 15,197 people, 5,039 households, and 4,061 families residing in this city in the year 2000. In 2006, a 27.5% increase in population is estimated. The lower lying Fountain terrain is at risk of flash floods. Fountain also contains several facilities that store large quantities of hazardous materials including a large above ground fuel storage facility.

Green Mountain Falls

This scenic mountain community is situated within Pike National Forest. The town of Green Mountain Falls has a total area of 1.1mi^2. In 2000, there were 773 people, 372 households, and 203 families residing in the town. Elevation is 7,705 feet. The natural scrub oak found along the mountain range provides a continuous fuel source for wildfires creating a threat to structures and people in the area. There are three Class 1 dams located upstream from the town. A breech of any of these dams would create severe damage and death to residents in this town as well as Chipta Park that is a residential community located a few miles down stream of Green Mountain Falls.

Manitou Springs

The city of Manitou Springs, a small resort community located at the base of 14,110 foot Pikes Peak, 4 Miles west of Colorado Springs. The town is situated along the Ute Pass. Elevation is 6,412 feet. The town lies in the canyon of Fountain Creek and the lower reaches of its tributary streams, a frequent source of flooding. Manitou Springs is traversed by Highway 24 and is within easy access of Interstate 25 with both roads being Designated Hazardous Materials routes. In 2000, the population was 4,980. Manitou Springs derives its name from two dozen mineral springs situated throughout the area. The terrain is mountainous. The town borders the Pike National Forest Wildland-Urban Interface with an average of 40 tons per acre of fuel loading that creates a constant wildland fire concern. Manitou Springs has also suffered from two tornadoes, although they are relatively rare in this area.

Monument

The town of Monument is located twenty miles north of Colorado Springs and fifty miles south of Denver. Elevation is 6,960 feet. Monument has a total area of 4.6mi^2. According to a 2000

Census, there were 1,971 people, 725 households and 550 families residing in the town. The population in 2006 is estimated to be 2,533; an increase of 28.5%. Interstate 25 divides Monument and Highway 83 runs north and south approximately 5 miles to the east of town. The treelined foothills place the area at risk for wildfires while the Interstate Highway and several commercial firms place the residents at risk from a hazardous materials spill.

AIRPORTS

Three military installations in the area, Fort Carson, Peterson Air Force Base and the United States Air Force Academy have small airstrips. Co-located with Peterson Air Force Base, the City of Colorado Springs Municipal Airport covers 7,200 acres and is located six miles east of the central business district of Colorado Springs. More than 2 million passengers pass through the airport each year making it the second busiest airport in the state of Colorado. The risk of a disaster is moderate to high given the close proximity of this airport to the city. The airport is a 3 level, 16-gate terminal, served by 8 Airlines and has approximately 110 arrivals and departures each day.

A major airfield, the Denver International Airport, is located within an hour's drive of Colorado Springs and has frequent flights between the two cities. These flights traverse over densely populated areas creating a possible hazard in the event of an in-flight accident.

On a smaller scale, there are several heliports in the area and private pilots have the convenience of Meadow Lake Airport, located 14 nautical miles northeast of Colorado Springs and Calhan Airport in Calhan. The combination of potentially over-confident pilots in light aircraft generates risk to the community. Couple this risk with unstable weather patterns and terrain-induced turbulence, and a dangerous situation can quickly arise.

DAMS

Class I and Class II dams are defined as follows:

Class I: A dam shall be placed in Class I when failure would result in probable loss of human life.

Class II: Significant damage is expected, but not loss of human life. The phrase "Significant damage" refers to structural damage where humans live, work or recreate, or to public or private facilities exclusive of unpaved roads and picnic areas. "Damage" refers to rendering these structures uninhabitable or inoperable.

There are many dams in El Paso County including 41 Class I and II dams. The western slope of the Rocky Mountains contains several watersheds that feed southern Colorado as well as several states to the south. The majority of these dams are owned by Colorado Springs Utilities that provide for water supplies to area residents and businesses. Many of these dams are located up stream from residential communities and pose a serious threat to life if the dam would breach. As examples, just outside Colorado Springs, Rampart Reservoir, a 500 surface-acre lake, houses Colorado Spring's domestic water supply and Spinney Mountain, located 40 miles west of Colorado Springs, contains a 2,500 surface-acre reservoir. All the Class 1 and 2 dams have emergency preparedness plans in place.

MILITARY INSTALLATIONS

This region has a significant military presence, posing some risk of military accident (e.g., gasoline storage tanks) or terrorist attack. There are five major installations in the area: Fort Carson, Cheyenne Mountain Air Station, Peterson Air Force Base, Schriever Air Force Base and the United States Air Force Academy.

Fort Carson is an Army post located southwest of Colorado Springs, between Interstate-25 and Highway 115. Fort Carson houses the 3rd Armored Cavalry Regiment, 3rd Brigade, 4th

Infantry Division, 43rd Army Sub Group (ASG), and 10th Special Forces Group. As a result, the site has several vehicle maintenance facilities for tanks and other tracked and wheeled vehicles. A complete tank engine depot maintenance and dynamometer testing facility is also located at the fort. The Butts Army Air Field is an active runway and hangar facility used primarily by Army rotary-wing aircraft.

Cheyenne Mountain Air Station (CMAS) is one mile west of Fort Carson and contains a command center 2,000 feet underground for monitoring the skies and space for hostile incoming weapons. Cheyenne Mountain was built with the knowledge that it would be a primary target for a nuclear attack, and it is perhaps the most fortified large underground installation in the world. The installation consists of 15 steel buildings, laid out in a 4.5-acre grid inside the mountain, and accessed through a tunnel and 30-ton blast doors. The buildings are suspended on 1,300 47" steel springs to absorb the shock of a nuclear detonation. About 1,500 people work inside the mountain. It is operated by the USA/Canadian North American Aerospace Defense Command (NORAD), and the US Space Command, which is headquartered in nearby Peterson Air Force Base. While most of the day-to-day operations have since moved to nearby Peterson Air Force Base, NORAD still maintains the Cheyenne Mountain Directorate for use in the event of an emergency.

Peterson Air Force Base is adjacent to and east of Colorado Springs off U.S. Highway 24. The Colorado Springs Airport, which shares runways with Peterson, services the area with direct connections to a wide variety of major cities. Within Peterson Air Force Base are four major military headquarters: North American Aerospace Defense Command (NORAD), U.S. Northern Command, Air Force Space Command and Army Strategic Command.

Schriever Air Force Base, the newest base in the United States Air Force, is located approximately 10 miles east of Peterson Air Force Base in Colorado Springs. The 50th Space Wing is headquartered at this site. The base is situated on 3,840 acres and its population is approximately 4,000 personnel

The United States Air Force Academy is located immediately north of Colorado Springs. The Academy is an institution for the undergraduate education of officers for the United States Air Force. Recent incoming classes have consisted of approximately 1400 cadets. The Academy is also one of the largest tourist attractions in Colorado, attracting more than a million visitors each year.

PRESIDENTIAL AND U.S.D.A - DECLARED DISASTERS AND EMERGENCIES

The tables below describes disasters declared previously by presidential order in the planning area.

El Paso County		
Hazard Type	**Location**	**Disaster Characterization**
Flood	El Paso County	Presidential Disaster, 1999
Drought	El Paso County	USDA Disaster, 2000
Drought	El Paso County	USDA Disaster, 2002
Winter Storm	El Paso County	Emergency, 2003

Winter Storm	El Paso County	Emergency, 2006
Winter Storm	El Paso County	Snow Emergency, 2007

Hazards in El Paso County

The State of Colorado is vulnerable to a wide variety of natural hazards that can threaten life and property. Damage to critical facilities and disruption of vital services caused by natural hazards has a significant impact on its communities. Additionally, recent local and national events establish that risks exist from human-caused hazards ranging from accidents to domestic and international terrorism. The section below discusses hazards deemed to have a potential impact on El Paso County, and it further delineates those "priority" hazards facing the county as selected by a consensus of citizens and experts.

In the analysis process the Working Group considered all hazards that have even a remote possibility of occurring. Hazards having significant loss potential for El Paso County and a higher probability of occurring were identified as Priority Hazards. Other hazards with less potential impact or with less effective mitigation action possibilities are discussed later in this section and are referred to as 'Other Hazards' and were not considered in this plan for further analysis.

In this plan, the determination of the Priority Hazards was made through a multi-step risk assessment process combining statistical modeling with more qualitative assessment activities. These qualitative risk tasks consisted of numerous interviews and surveys of emergency response and planning professionals, online and written surveys of County residents and independent Historical research, which drew information from many sources. Through this process, certain hazards were determined to pose the greatest threats to the planning area and were prioritized as discussed in the following section.

PRIORITIZED HAZARDS

Based on the risk assessment discussed elsewhere in this Plan as well as public input, the highest risk hazards were identified for further analysis and mitigation planning. These hazards are:

- Wildfires
- Hazardous Material (HAZMAT) Spills
- Severe Weather (Flooding, Tornadoes, Snowstorms, Lightning)
- Disease Pandemic
- Landslides/Rockslides
- Extreme Acts of Violence in schools
- Earthquake
- Terrorism
- Airplane Crashes
- Dam Breach (Intentional or Unintentional)
- Military Accident
- Avalanche
- Drought

It was determined that these hazards posed a greater overall risk to life, safety, critical infrastructure, vital services and the economic well being of County residents. Future iterations

of the PDMP will possibly include mitigation actions for hazards other than those later prioritized by this Plan. Each of these risks are further discussed below and later in the document are prioritized for PDMP actions.

WILDFIRE

El Paso County is not unique in the State of Colorado for its recent and difficult experiences with wildfire. In fact, the entire Rocky Mountain region has been plagued with wildfires in the past several years. During Colorado summers, high temperatures and low humidity can create tinder-dry conditions that feed wildfires. The situation has been fueled by severe drought conditions that began in the late 1990s and continue today. The years of 2000 to 2002 were years of acute drought that severely stressed the trees in the Pike National Forest and other forested areas. The stressed trees became highly susceptible to disease and insects with the most notable being the Pine Beetle that has killed thousands of acres of pine trees throughout the county. The drought was not an anomaly, but a natural occurring process. Future dry periods will also weaken the forests and influence wildfires. Approximately 1 million people live in 6 million acres of Colorado's high fire hazard forests. It is no surprise that the overall PDMP risk assessment determined that wildfires pose the most significant threat to the planning area. Three classes of fire characterize the wildfire threat:

- Surface fire: the most common of these three categories, the surface fire burns along the floor of a forest, moving slowly and killing or damaging trees.
- Ground fire: this fire is usually started by lightning or human carelessness and burns on or below the forest floor.
- Crown fire: these spread rapidly by wind and move quickly by jumping along the tops of trees.

Crown fires generally pose the largest immediate and long-term ecological effect and the greatest threat to human settlements near wildland areas. Surface fires play an important role of reducing low vegetation and layers of dead tree material such as pine needles and branches, which helps to temporarily reduce the chance of such fuels leading to severe crown fires. Ground fires reduce the accumulation of organic matter and carbon storage, and contribute to smoke production during active fires and long after the flames have ended. These fires can also damage and kill large trees by killing their roots and the lower stems.

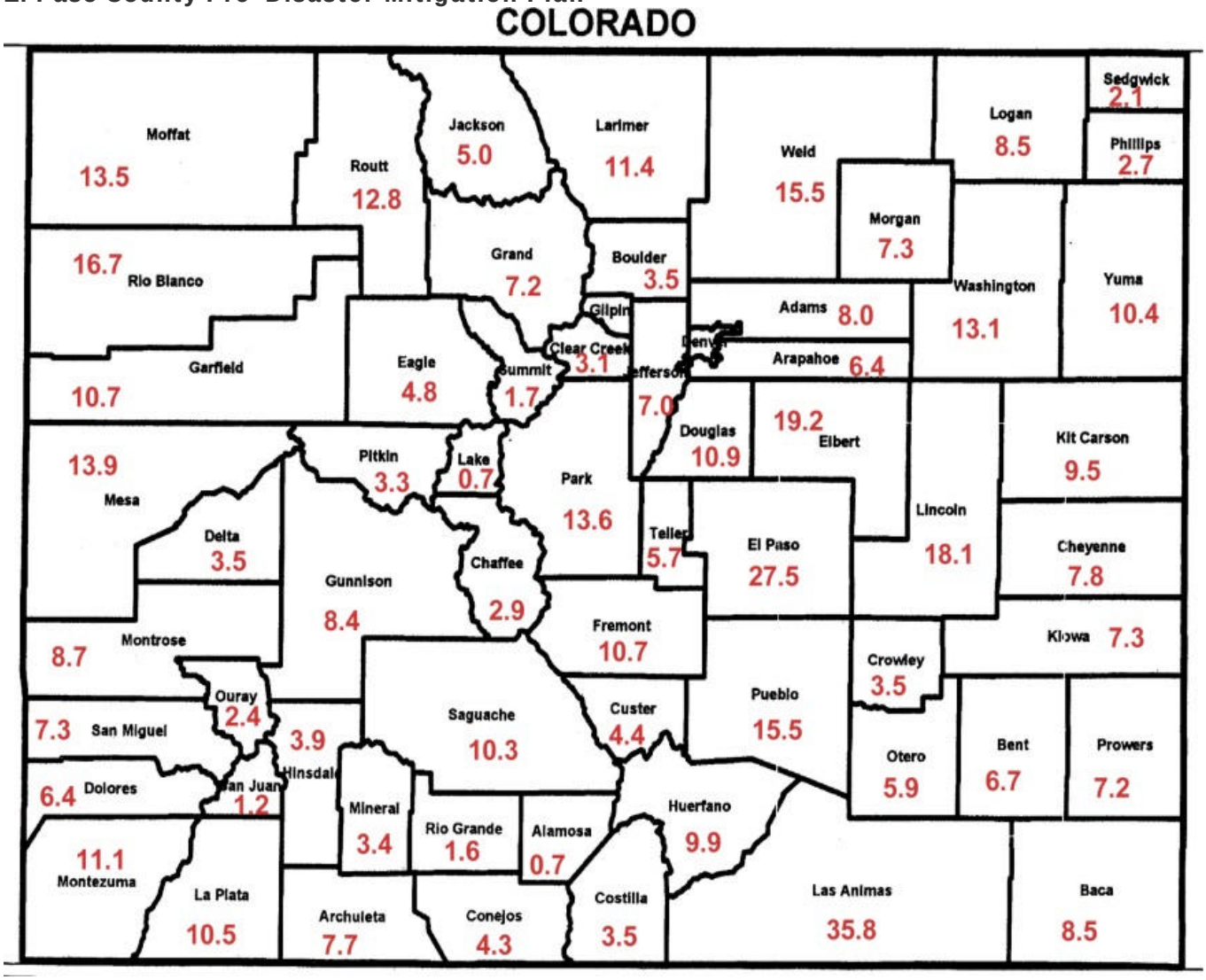
During 2001 and 2002, the Colorado State Forest Service compiled a Wildland Urban Interface (WUI) Hazard Assessment for the purpose of mapping the residential areas throughout the State that lie in Wildland Fire Hazard Areas. WUIs are defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Various data sources including housing density, fuel load and proximity to government lands were analyzed in a Geographic Information System (GIS) model to identify the residential areas at risk. The WUI Hazard Assessment is intended to be used as a tool to compare fire hazard in various areas in Colorado and within El Paso County itself. The wildland fire map below illustrates clearly where the WUI communities within El Paso County area converge with areas showing a high potential for Wildfire. These areas currently contain over 36,000 homes. More than six million acres of forestland in Colorado is at high risk for catastrophic wildfire. This area is referred to as Colorado's Red Zone. The Colorado Red Zone identifies not only areas with high potential for large, severe wildfires but also where such events are unacceptable.

Colorado is a desirable place to live and as more people make this area their home, we find homes being built in the wild land urban interface. Many homeowners find the natural forest landscape surrounding their homes appealing. However, this natural foliage is also a fuel

source for wildfires. Factor in record drought conditions and fuel build-up that will take years to mitigate successfully, and we have a situation that causes a great deal of concern. In a recent Colorado Forest Service/Colorado State University study, El Paso, with over 150,000 acres of open space, was rated the #1 County in the State for susceptibility to Wildland Urban Interface (WUI) Fire. In 2007, Colorado College published its annual State of the Rockies Report, which covers 8 states and provides for the current state of various topics from wildland fire susceptibility to economic growth. In this report El Paso County was rated #10 in the 8-state region for potential for a catastrophic wildland fire. El Paso County was the only county in Colorado to make this unfortunate list. The reasons cited were number of houses in the WUI, drought conditions, and fuel loading in the WUI. The WUI has an estimated 36,000 houses along the Eastern Slope of the Rocky Mountains from Palmer Lake, Monument, and Black Forest down the entire Front Range to the Pueblo County line. To the west the WUI includes Cascade, Green Mountain Falls, and Chipita Park along with the hundreds of houses located in mountain areas west of Colorado Springs. These towns and communities are all located in areas highly forested with fir, scrub brush, and pine trees seriously damaged by Pine Beetle kill and underbrush "die-out" from a 7-year drought. These areas border the Pike National Forest where little underbrush mitigation has occurred, producing an estimated 40 tons per acre of fuel load. Hazard maps that depict these areas are located at Appendix D.

The 2002 wildfire season was particularly memorable because it was the worst in United States history, with some 2.3 million acres burned, 2.1 million more than in 2000. In Colorado, 4,612 wildfires burned over 619,000 acres that year and cost approximately $152 million in suppression costs. Approximately 81,400 people were evacuated and about 1,000 structures burned. In addition, nine lives were lost. In El Paso County, approximately 30,000 acres burned in 2002. Based on a ten-year average, Colorado typically experiences 3,119 wildfires with a loss of 70,000 acres per year. El Paso County averages over 100 wildland fires each year with the number increasing with the population. Although many fires are caused by lightning strikes, most are human caused. Historically most wildland fires have occurred in the eastern part of the county, which is comprised mostly of grass plains with only a moderate number of houses. With relative humidity generally in the single digits, mountainous terrain, high pine beetle kill and fuel loading, it is not "if" but "when" a catastrophic fire ignites in the western part of the County, in the WUI, where over 36,000 houses are located.

History shows that most of Colorado's wildfires are frequently caused by lightning strikes from thunderstorms that regularly pass through the state during the summer months. El Paso County experiences more than its share of these weather conditions. In fact, lightning strikes were ranked as one of the more severe natural hazards in the county survey taken pursuant to this plan. And as the map shows below, El Paso County receives the most lightning strikes per year in the State, by far. Dry lightning strikes, common to the County, create numerous small hotspots of fire that have the potential to grow into larger full-fledged fires. As an example in August 2006 one lightning storm created 6 wildland fires in a 20 minute timeframe in a single Fire Protection District (Palmer Lake) . This required fire support from three adjoining Districts to extinguish these fires.



The above map estimates number of cloud to ground lightning flashes (in thousands) that occur annually in Colorado counties.

The hotspots can spread over a large area and are very challenging for fire crews to locate and control. In many cases, the terrain and weather patterns in this County add another layer of complexity. On average, over 2,500 forest fires occur in Colorado each year, two-thirds caused by lightning. High temperatures, low humidity and gusting winds, coupled with deep canyons and steep hillsides, can make firefighting extremely difficult in this region. The 1994 Storm King Fire was started by lightning and fueled by wind gusts over 45 miles per hour. The wind created a wall of flame that was moving at a speed of 30 feet per second. The flames reached 200 – 300 feet high.

In a more recent example, 90 homes were evacuated while firefighters struggled to battle a 1,800-acre wildfire, sparked by lightning, near New Castle, Colorado. The firefighting effort was hindered by erratic afternoon winds, in addition to steep, brush and tree-covered terrain. Closer to home, an April 2006, a grass fire in the town of Fountain, fed by gusty winds, grew to 1,800 acres, forcing the evacuation of 100 people and closing a major highway. Winds gusting to nearly 50 mph along the eastern edge of the Rockies pushed the fire along a creek, across grass and scrub oak parched by dry weather. In 2007 numerous wildland fires. Two of the larger fires resulted in the evacuation of many residents from the towns of Manitou Springs and

Ellicott. The Manitou Springs fire resulted in 800 acres being burned in the vicinity of the Bar Trail for those hiking Pikes Peak. The fire was in an area that was so steep in elevation that water could not be pumped through hoses. The entire fire was fought by hand crews and water drops from aircraft. The Ellicott fire was a prairie fire of over 1000 acres that resulted in flames over 20 feet high and the loss of several vehicles and outbuildings.

Although lightning strikes cause most fires, it is the Mountain Pine Beetle that causes the majority of fuel loading within the forested areas. It is this fuel loading, estimated at 40 tons per acre that allows small fires to rapidly grow into catastrophic fires.

Mountain Pine Beetle (*Dendroctonus ponderosae*)

The mountain pine beetle (MPB) is historically the primary cause of mortality in the old, slow-growing ponderosa, lodgepole and limber pines in Colorado. According to experts, it is the insect that causes the most significant damage to the state's forests, and it has become the insect whose damage attracts the greatest public interest.

The mountain pine beetle attacks and kills trees in a manner similar to a pest known as the *ips* beetle. The MPB only produces one generation per year. It generally attacks trees that lack vigor due to old age and crowding, drought, fire, mechanical damage or root disease. During the early stages of an outbreak, attacks are largely limited to trees under stress. As the beetle population increases, attacks often spread to healthy trees in the afflicted area. The density and similar ages of many of Colorado's ponderosa pine and mixed conifer forests is a significant influence in the size and rate of spread of the current outbreak. Scientists estimate that many stands are at least twice as dense as is desirable for natural resistance to bark beetles. MPB populations have nearly doubled each year since the mid 1990s, and aerial surveys indicated approximately 450,000 trees were infested over 150,000 acres in 2001 and an additional 600,000 trees had been impacted in 2002. More recent Aerial surveys recorded 1,256,320 trees killed by beetle activity in 2004, compared to 696,400 reported killed in 2003, 275,000 in 2000 and 13,000 in 1996.The situation, in short, appears to be worsening.

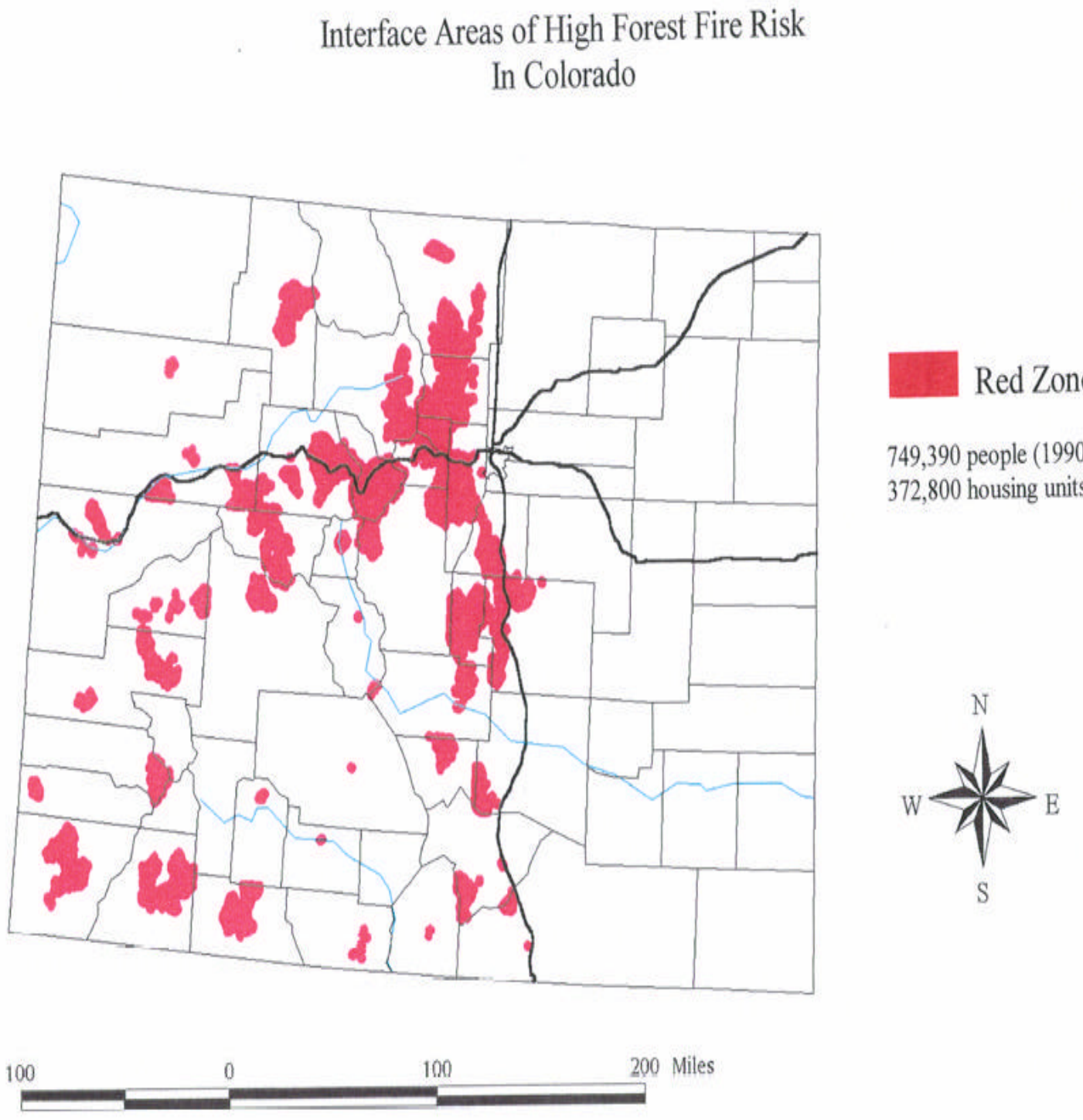
Pine forests in the western part of El Paso County continue to see heavy MPB mortality with concentrations throughout the WUI as well as the mountain areas to the west of Colorado Springs.

An important method of prevention involves forest management. In general, MPB prefers forests that are old and dense. Managing the forest by creating diversity in age and structure will result in a healthy forest that will be more resilient and, thus, less vulnerable to MPB. Most mature Colorado forests have about twice as many trees per acre as those forests, which are more resistant to MPB.

Preventive spraying before attack may protect individual high-value trees if done prior to the beetles' normal flight time in mid-July through September. At the landscape scale, thinning that reduces competition, improves tree vigor and lessens fire hazard is an excellent option for mitigation and can be followed by the reintroduction of fire where appropriate.

In 2002, Colorado saw the worst wildfire season in state history resulting in a Presidential Disaster Declaration. The season ended with fires burning 7.2 million acres and costing over $1 billion to fight; 380 homes were lost and more than 80,000 people were evacuated. The premiere fire of 2002 was the Hayman that burned 138,000 acres and 133 homes in 20 days. It still holds the record for being Colorado's largest wildfire ever. El Paso County had 30,000 acres burned that year. Beginning in 1998 La Nina brought below-normal precipitation and unseasonably dry air masses to the Colorado Front Range. Conditions degraded year after year

becoming drier with each passing season. In the summer of 2002 the fuel moisture conditions were among the driest seen in the past 30 years.



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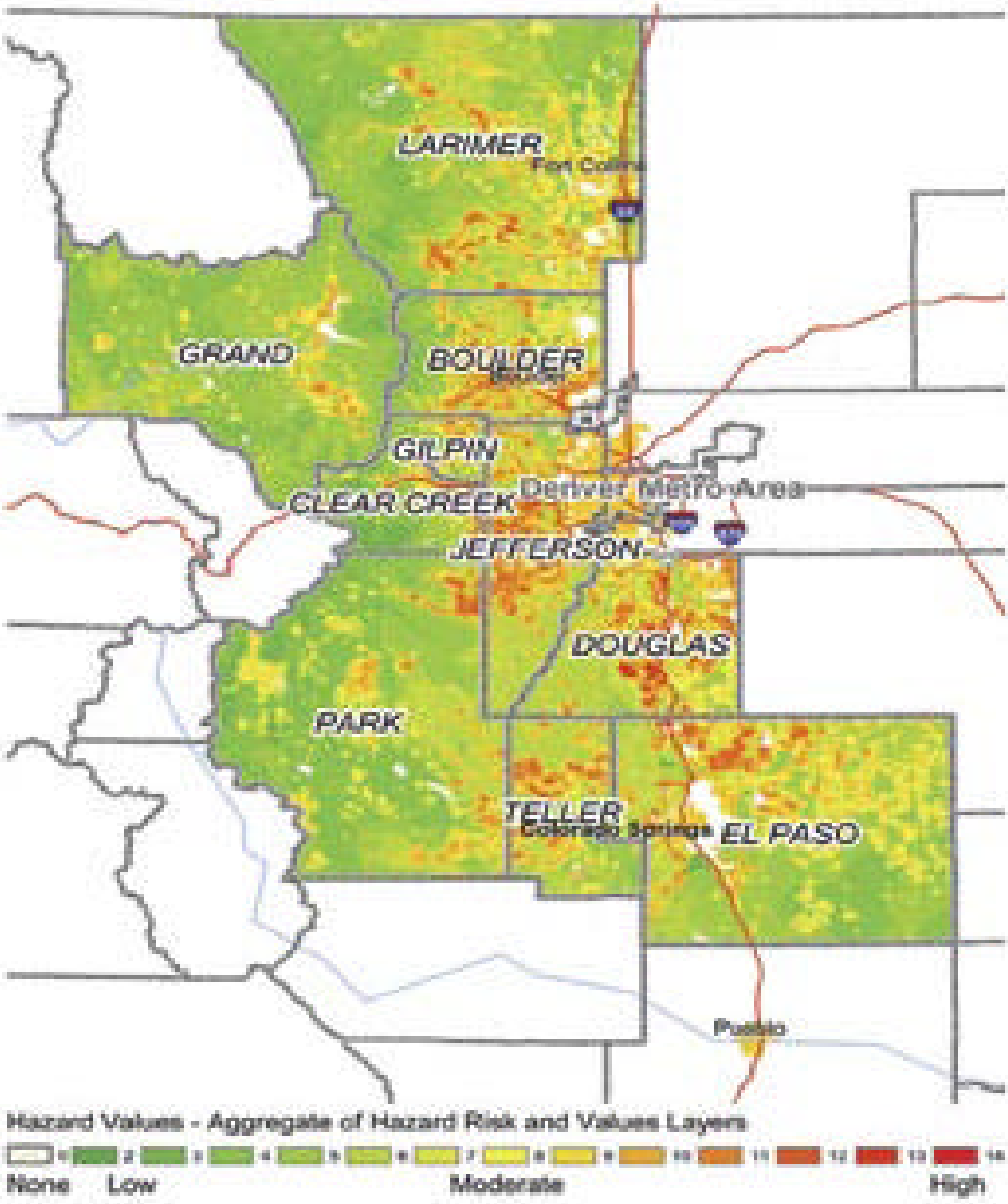

LARIMER
Fort Collins
GRAND
BOULDER
GILPIN
CLEAR CREEK
Denver Metro Area
JEFFERSON
DOUGLAS
PARK
TELLER
Colorado Springs
EL PASO
Pueblo
Hazard Values - Aggregate of Hazard Risk and Values Layers
None
Low
Moderate
High

El Paso County is a member of the Pikes Peak Wildfire Prevention Partners (PPWPP), a coalition of federal, state and local government agencies, fire districts, military installations, land-management agencies, private landowners, homeowners' associations, Conservation organizations, and other stakeholders. This partnership was created to reduce wildland fire risks through sustained fuels treatment and encouraging the creation of defensible space in and around structures in El Paso, Douglas and Teller counties. Extensive participation from local governments, public involvement, and collaboration in identifying and supporting specific project areas and types of treatment are considered keys to future successes.

In addition to the PPWP the Fire Wise Program is slowly building support in various parts of the County. Both programs are still challenged to obtain the "attention" of the public in general. This is primarily due to the fact that there has not been a large fire in WUI as the City and County fire assets have historically been able to hit a small fire hard and keep it from growing. The perception then by many residents living in the WUI is that there is not a real threat from a large fire. Additionally, Grambling Oak is fairly dense in the WUI and clearing this brush is extremely time intensive and many times beyond the level of effort that many residents want to expend. Finally many residents live in the WUI for the trees and the natural beauty of forested areas, and do so at a rather higher expense than the average resident living in other parts of the County. Many residents are reluctant to clear some of the trees and brush for fear of removing this "natural beauty" in which they have paid extensively to enjoy.

Currently, predictions of below normal precipitation coupled with higher than normal temperatures may lead to dry conditions similar to those exhibited in 2002. Colorado's forests are already laden with fuel, and if warming temperature trends continue, this fuel will become very dry making fires almost certain. The combined impact of drought and adverse forest environment across Colorado creates dangerous wildfire conditions that threaten the lives and property of Coloradoans. Based on this potential for another disastrous year of wildfires, the Governor proclaimed a "Lightning Safety and Wildfire Awareness Week" in June 2007 to promote awareness and strategies to prevent wildfires

Based on current conditions within El Paso County that include heavy fuel loading, 36,000 homes in the WUI, rapidly expanding housing areas, weather trends, the economics of the area, and residential "perceptions and attitude", wildland fire will continue to pose a high threat to the entire county. In the west and the I25 corridor the threat is to a large population of homes located in the WUI. To the east the danger is increasing due to the large number of new housing developments that have been established within the last 5 years and will continue into the future. The fire response situation has been exasperated as until 2005 new housing developments were not required by law to plan for fire support or water supplies (cisterns) for fire departments. Since then the Land Development Code has added measures to insure new developments provide for mitigation actions, provide for water storage (e.g. cisterns), road access for first response vehicles, and the use of fire retardant building materials. The rapidly expanding population in the east and historical lack of proper fire planning has resulted in many volunteer fire departments being severely challenged to provide fire support for these ever increasing communities.

Current ability to hit a fire, "keep it small", and extinguish it is severely limited due to the lack of brush trucks in the County. In 2006 El Paso County set a record for most wildland fires in a 90-day period. Fortunately, a significant amount of luck and automatic mutual aid from throughout the County, helped keep these fires small. With the current fuel load and weather trends, it is expected that a wildland fire not immediately suppressed will quickly grow at an incredibly fast rate. The county is supported by a volunteer wildland fire team and 25 Volunteer Fire Departments (VFD) that have an average response time of 20-30 minutes. Unfortunately Highway 115, Peyton, and Hanover Fire Departments are extremely short firefighters. Additionally, only 13 of the 25 VFDs possess brush trucks. In many incidents, fire

support must come from another VFD with response times in excess of 45 minutes. Some areas of the county are NOT covered by any VFD including, several residential areas on the east side of Colorado Springs and an extensive area in the southeast part of the county. The wildland fire team does not currently possess a brush truck. Although team members are highly experienced they are currently a handcrew as the only brush truck in its inventory was recently removed from service for safety reasons. Recently, the County Commissioners agreed to provide funding for a brush truck. This truck is expected to be delivered sometime in early 2008. Equipment in the various VFD varies from a few new fire trucks to many older model trucks and converted milk trucks as tenders. Funding to procure new equipment is extremely limited. This includes the ability to obtain grants for new equipment as most grants have a cost share that is still beyond the ability of these departments to fund.

As described in the above paragraphs, there are generally 7 factors that contribute to a potential large scale wildland fire. They are 1) topography and fuel loading 2) building construction and design 3) landscape maintenance 4) defensive space 5) accessibility 6) fire protection response time 7) water availability. Based upon this a combined approach is required to mitigate or prevent a future wildland fire. This combined approach consists of public awareness, fuels mitigation, improved building codes, a mass evacuation plan, and improved response to a fire. Specific goals and objectives for each factor are covered later in this plan.

From past history, it is evident that large scale fires in El Paso County have a fire return of approximately 50 years. This 50-year fire is severe in nature and very destructive. Historically there have been three large scale fires in El Paso County which occurred in 1853, 1890, 1950. Based on this history El Paso County is overdue for its large scale fire. In the past the fire primarily affected forested area but future fires will now potentially involve over 36,000 homes, numerous historical sites, and special sites such as Seven Falls and Garden of the Gods. The potential loss is difficult to ascertain as it depends on the extent of the fire. But if we were to overlay the 2002 Hayman fire onto the WUI west of Interstate 25 the loss would be in the billions of dollars. With the rapidly increasing population the probability of such a fire occurring in the future is almost guaranteed but the effects can be mitigated with proper execution of the goals and objective cited later in this PDM plan.

The probability and impact of a large scale wildland fire continues to increase each year. This is primarily due to the number of residential areas that are being built in the WUI and the continued fuel loading in these areas. The impact is compounded by the shortage of firefighters and the shortage, or condition, of response equipment designed for wildland firefighting in several of the Volunteer Fire Departments.

HAZARDOUS MATERIAL (HAZMAT) SPILLS

In addition to the Union Pacific Railroad, there are several major roadways in this area: Interstate-25, US Highway 24, US Highway 85/87, Colorado State Highways 83, 94 and 115. These significant transportation routes pose a potential crisis when shut down due to extreme weather hazards or other danger. There is also risk from hazardous material spills. FEMA defines Hazardous Materials as chemical substances that, if released or misused, can pose a threat to the environment or health. These chemicals are used in industry, agriculture, medicine, research and consumer goods and come in the form of explosives, flammable and combustible substances, poisons and radioactive materials. There are currently over 380 chemicals that are listed on the Environmental Protection Agency's (EPA) list of Extremely Hazardous Substance List. Federal Law (42 USC, Title III) places several requirements on local governments and businesses that apply to HAZMAT reporting and response. Title III has four primary requirements that: 1) establishes mandatory training requirements for first responders

(29 CFR 1910.120) and the requirement to establish a Local (Chemical) Emergency Planning Committee consisting of government, first responders and local businesses that respond to or maintain HAZMAT; 2) requires that any facility that maintains Extremely Hazardous Material at certain quantities must report them to the local Designated Emergency Response Authority (DERA). The reporting method is via the Tier II report established by EPA; 3) makes the Tier II reports available to the public upon request; and 4) the local government (DERA) must establish a method of emergency notification should a life threatening HAZMAT spill occur.

Colorado Revised Statue 29-22-102 designates the County Sheriff as the Designated Emergency Response Authority (DERA). The DERA is responsible for planning and coordinating emergency response to HAZMAT spills within the County. It also requires that the Sheriff maintain a HAZMAT response plan that is in accordance with 42 USC. This plan includes the annual requirement to conduct a risk assessment of both fixed facilities that maintain reportable HAZMAT as well as those roads that are designated to transport HAZMAT.

The unincorporated areas of El Paso County currently contain 66 facilities that report HAZMAT under the Tier II reporting system. These facilities include major pipeline companies (Conoco-Phillips, Valero, and Rocky Mountain Pipeline) that have enormous pipelines that traverse the county, large fuel storage facilities, and facilities that contain extremely toxic chemicals that are airborne hazards such as chlorine and hydrogen cyanide. El Paso County also contains one Interstate Highway (I-25) and five State Highways (24, 83, 105, 115, and 94) that are designated for transport of Extremely Hazardous Materials. Naturally, I-25 contains the most transported HAZMAT that also includes extensive quantities of Type III Radiological Materials. Highway 24 is second for quantities that include quick lime and hydrogen cyanide being transported up the mountains to support local mining operations. The County also contains a major north-south railroad line (BNSF and Union Pacific) that transport large quantities of toxic material. These trains travel through the County numerous times each day with many trains containing several cars of hazardous material. Most railcars carry approximately 45,000 gallons of hazardous material that could create devastating effects on County residents if any one of them should breech. The most dangerous situation would be the accidental release of an airborne toxic material such as chlorine or anhydrous ammonia that would require the potential evacuation of up to 5 miles from the release point. A map of the designated HAZMAT routes in El Paso County is located at Appendix D.

FEMA figures from 1997 period indicated that approximately 6,774 HAZMAT events occurred nationwide. About 5,517 were highway incidents, 991 were railroad incidents and 266 were attributed to other causes. In 2004, a total of 179 events were reported in Colorado, and a total of 54 (30.2%) events occurred in fixed facilities. Of the 125 transportation-related events, 120 (96.0%) occurred during ground transport (e.g., truck, van, or tractor) and 4 (3.2%) involved transport by rail. Only one event involved pipeline transportation mode. Most (91.2%) ground transportation events involved trucks. The largest portion of transportation-related events occurred due to releases en route that were later discovered at fixed facilities (51 [40.8%]) and from a moving vehicle or vessel (37 [29.6%]). Of the 125 transportation-related events, 36 (28.8%) involved a release that occurred during loading/unloading of a stationary vehicle or vessel.

HAZMAT spills within El Paso County have doubled each year for the last four years. This is directly attributed to the increase in population and number of businesses that maintain reportable levels of HAZMAT. In 2006 there were over 90 call outs for HAZMAT spills, with over 150 stand-by missions ranging from chlorine spills to over-turned fuel tankers. Additionally, the State Of Colorado Highway Patrol has a mutual aid agreement with the El Paso County and City of Colorado Springs HAZMAT Teams to respond to all spills on I-25. These transportation related spills range from overturned fuel tankers to radiological spills.

HAZMAT incidents also occur as a result of natural hazard events such as floods, wildland fires, tornadoes, high winds and winter storms, which in addition to triggering a HAZMAT incident, can also hinder response efforts. As an example, in 2006 lightning caused a large wildland fire

in the Widefield-Security unincorporated communities of El Paso County. The fire consumed a chlorine storage facility that contained over 25 150-pound chlorine cylinders. While some of the cylinder's fusible plugs breeched in the fire, 8 did not. This created two extreme hazards: 1) a chlorine cloud that endangered the local residents and hindered fire fighting efforts and 2) 8 chlorine "bombs". During this incident over 200 residents had to be evacuated and placed into Red Cross shelters. The 8 chlorine cylinders that had failure of the fusible plugs had to be removed, placed into cylinder coffins at great risk to HAZMAT personnel, removed to a remote area, and detonated by the local Explosive Ordnance Disposal team.

Hazardous materials in transport are especially vulnerable to transportation related accidents, sabotage or misuse and, in the wrong hands, pose a significant security threat. The security of hazardous materials in transportation poses unique challenges as compared to security at fixed facilities because of the changing environment surrounding a moving vehicle. Most hazardous materials are frequently transported in large quantities, and once mobile, they are particularly susceptible to theft, interception, detonation or release. When transported in proximity to large population centers, accidental or intentional acts could have serious consequences.

When hazardous materials are not controlled due to improper use or accidents, they can quickly create a dangerous and/or life threatening situation. Because of the extensive amount of HAZMAT that is transported in El Paso County the potential for accidents involving materials is very real and the consequence could be very devastating.

The probability and impact of a HAZMAT spill continues to increase each year. This is due to the increasing number of facilities that maintain HAZMAT and the increasing number of trucks hauling HAZMAT on roads in the county. The greatest risk for a transported HAZMAT spill is to residents and businesses along I-25, and the paralleling railroad line, and the five State Highways. For a fixed facility spill the greatest hazards is posed to those homes and businesses located near the 66 fixed facilities that store hazardous materials. The greatest risk is in the city of Fountain where there is a large above ground fuel storage facility, and to those homes and businesses located to the east of Powers Boulevard but north of Galley Road. This is due to several facilities being nested on the edge of an older, large housing development. Also at risk is critical infrastructure that may require evacuation during an airborne toxic event. Based on historical data, the number of spills is increasing with the population and with the number of HAZMAT transporting vehicles that move over the highways, especially Interstate 25. Therefore, this threat will continue to increase.

SEVERE WEATHER

To the surprise of no one, severe weather can and does occur quite frequently within El Paso County. This severe weather varies significantly in size, strength, intensity, duration and impact and includes thunderstorms that create flash floods, snowstorms that create whiteout conditions, drifts in excess of 14 feet with dangerous wind chill factors that sometimes lead to life-threatening conditions, and tornadoes that vary in intensity. Each of these is discussed in more detail below.

Flooding (Including Flash and Seasonal Flooding)

According to NOAA, flash floods in the United States are responsible for more deaths than any other thunderstorm phenomena. Year to year in Colorado, only lightning is more deadly. Floods are the most frequent, deadly, and historically cause the greatest amount of natural

hazard damage in El Paso County. Flooding can occur in one drainage area or in multiple watersheds at the same time.

Flash flooding usually is the byproduct of very heavy rains in a short period of time over a small geographic area, all of which combine to cause normally small streams to turn violent. Flooding as a natural hazard is a problem for El Paso County, and the extreme terrain in the area increases the potential for severe flooding. Flooding occurs in El Paso County during the spring and summer and generally occurs in the form of flash floods. Due to the number of creeks in the county, coupled with the steep elevation and soil type, the threat of flash floods is extremely high. Some flooding can be predicted by weather reports, but many times smaller flash floods are a result of a microburst system, which overwhelms both natural and constructed drainage systems. Such failures often cause excessive damage to towns, industry and farms in the floodplain areas. Emergency services, transportation, power, water and wastewater services, business and hazardous materials storage can be substantially disrupted, which can affect the population located in or near the flooded area.

Flooding costs between $4 to $6 billion annually in the United States (in 1990 dollars, The Citizens Guide to Geologic Hazards, Nuhfer, Ed). There are several creeks in the County that, under normal rainfall conditions, pose a significant threat. The risk and threat is during intense storms of short duration that dump several inches or more of rain during a period of a few hours or continual precipitation over several days. The two largest creeks in Colorado Springs are Fountain Creek and Monument Creek. Monument Creek flows south and enters the City near the U.S. Air Force Academy. Upper Fountain Creek flows east down the Ute Pass from Woodland Park and enters the city just east of Manitou Springs. Monument Creek empties into Fountain Creek near the intersection of I-25 and Highway 24 or just west of the downtown area. Once Monument Creek reaches this confluence it empties into Fountain Creek and the combined Creek is known as Fountain Creek. Fountain Creek then continues to flow south to Pueblo through El Paso and Pueblo Counties. In addition, Sand, Black Squirrel and Chico Creeks and other creeks have flooded in the past. A map of the watershed areas in the county is located later in this section.

The county has endured many floods that have caused significant damage to local residents, infrastructure and businesses. Although it is common to have some form of flooding every 5 years, major floods have occurred in the Colorado Springs area in 1864, 1886, 1935, 1965, 1995 and 1999. The history of flooding is best depicted by the below records obtained from the El Paso County Gazette with greatest damage occurring in the 1999 flood in which El Paso County received a Presidential Disaster Declaration due to flooding.

EL PASO COUNTY FLOODING HISTORY

June 10, 1864 20-30 foot rise in Fountain creek swept away almost all of Colorado City – several victims

July 3, 1882 Flood down Ute Pass in Manitou, bridges and railroad tracks destroyed, 1 victim

July 26, 1885 *Flash Flood Swept Away Homes, People and Livestock*
"Water Spout" (sudden downpour) caused Shooks Run, Fountain and Cheyenne creeks to overflow, railroad bridges on the Manitou branch wiped out, demolished the Rio Grande bridge --- storm dumped 16 inches of rain and hail in one hour, devastating downtown Colorado Springs. 1 victim

August 1, 1886 Repeat of 1885 Flood

August 1, 1915 "Great Sand Creek Flood" – east CO Springs – 3 victims

June 21, 1921 *Deluge of Water Submerges Springs – Pueblo Inundated*

Sand Creek – 15 feet deep, Fountain Creek overflowed, Shooks Run a river with water flooding several blocks in northwestern part of Colorado Springs – South Nevada Ave. flooded

Sept.1, 1929 *Flood Hits Summer Homes – Mountain Resort is Wiped Out*
College Gulch flooded by 15 ft. wall of water caused by the breaking of dams on Ute Pass Fish Club – wiped out Crystola, Midland tracks washed out. 1 victim

May 30, 1935 *Memorial Day Flood*
Monument Creek floods 200 square blocks of city, southern end of Co Springs under water, 8 victims – estimated $ 1.769 million in damages. Monument Creek had a peak flow of 50,000 cfs into Fountain Creek

June 15-19, 1965 *Storm in Region Causes Wide Damage*
7" of rain, 2-3" hail in Security and Fountain areas – Sand, Squirrel, and Fountain Creek overflowed, Hancock Expwy. Section washed away, 8-10 bridges swept away

Tornados, Floods Continue to Plague Pikes Peak Region
Jimmy Camp Creek runs at 124,000 cfs, Fountain Creek rampaging, all out of town public transportation at a standstill, highways closed, , bridges torn out, flash flood down Crews Gulch, Stratmoor Valley evacuated, Fountain Valley School Reservoir dam burst, Janitel Bridge damaged, hundreds seek refuge in Co Springs Auditorium – estimated $ 3.4 million in damages for El Paso County

July 24, 1965 Flash floods cause landslide on Cheyenne Mtn. Zoo, damage to ape and hippo houses, Seven Falls area. Boulders dislodged from Cheyenne Mountain crossed Highway 115 onto Fort Carson

July 24, 1970 Flash floods cover Constitution Ave. to Fountain Blvd, 1 victim

August 20, 1970 9-11" of rain cause flooding, rock slides in Rock Creek Canyon

July 21, 1972 Jimmy Camp Creek Washout, $50K damage to roads and bridges

July 2, 1980 Heavy rains cause flooding

July 21, 1985 I25 closed down, nearly 2-5" of rain, Gold Camp and Old Stage Rd. closed

July 14, 1996 El Paso County hardest hit with numerous washed-out roads and bridges – statewide flood damage estimates exceed $38 million

July 27, 1996 *Springs is Hammered Again*
Flooding, hail, power outages, 1-3" rain – (1.5" in 45 minutes)
Fountain and Monument creeks overflowed, water 3 ft. deep on streets

June 11, 1997 *Flood Waters Still Raging Through Area*
6-10" rain, roads closed, Fountain and Cheyenne creeks washed out bridges, evacuations in Red Rock Canyon and Manitou, Seven Falls closed

July 30, 1998 3-4" rain in El Paso County, washes out County Fair, streets flood, bridge collapse

May 2, 1999 *Waterlogged*
Four days of rain/snow – 13" in Seven Falls, 12.16" in Manitou Springs, Monument 7.9" - Fountain Creek overflowed

Historically heavy runoff in the main channel of Upper Fountain Creek and its tributaries in the Ute Pass, have frequently caused flash flooding in the Manitou Springs area. In 1999, a flood ripped through Manitou Springs, Palmer Lake, Colorado Springs and Fountain causing over $30 Million in damage to homes, businesses and major infrastructure. To date the floods that produced the greatest damage was the 1935, 1965, and the 1999 floods. Today, a major flood of the magnitude seen in 1935 or 1965 would result in floodwaters topping Interstate-25, submerging much of the Martin Drake Power Plant and overwhelming the massive water treatment facility in the area, releasing a massive amount of raw sewage down a raging Fountain Creek. Farther downstream, toward the city of Fountain, bridges would be topped, additional sanitation facilities would be breached, roads made impassable, railroad beds washed out and mobile home communities destroyed in the flood's path.

Manitou Springs is especially vulnerable to flooding and has limited flood protective measures. This situation may have an adverse impact on Colorado Springs in the debris, houses, trees, and other items can be carried downstream in Fountain Creek towards Colorado Springs. This debris can lodge under bridges causing an already dangerous situation to become more so.

State Highway 24 at Fountain Creek
1999

Debris Flow at the Manitou Spring Bath House
1999

The effects of flash floods can, in general, be determined in advance. The flooding from the April/May 1999 storm was considered a 10-year event by the Army Corps of Engineers. The estimated peak discharge on Fountain Creek near Fountain was 20,100 cubic feet per second (cfs). Damages in El Paso, Pueblo, Otero and Bent counties were in excess of $61 million. El Paso County incurred close to $30 million dollars in damage to public property (Jim Mesite, Emergency Manager, El Paso County, February 2004). Of this $30 million approximately $7 million was addressed/repaired by the Natural Resources Conservation Service (John Valentine, NRCS correspondence October 2003). The $7 million included the local cost share by various owners and jurisdictions within El Paso County. By contrast the 1935 Flood that started along Monument Creek was estimated between 50,000 cfs (1971 Corps of Engineers Report) and 53,000 cfs (USDA report on the 1935 Flood). 331 lives have been lost in Colorado between 1900 and 1993 and over $3.3 billion dollars (1995 State estimate) in damage due to flooding (Corps of Engineers Report, Post Flood Assessment Report Arkansas River Southern Colorado, 1999).

There are varying estimates of what constitutes a 10-year, 100 year or Standard Project Flood flowrate. This PDM Plan does not list or discuss the differences and the reasons therefore because it is outside the scope of this report. The point of the PDM Plan is to underscore that

flooding is a natural disaster that has a high probability of occurring again in El Paso County. It is important that everyone realize that this arid area can experience devastating floods that can result in loss of property and, potentially, the loss of lives as well.

The 1935 Flood was perhaps the worst flood from which El Paso County residents have had to recover. If the 1935 Flood occurred today the losses within the County could easily be in the billions of dollars, with major facilities and critical infrastructure heavily damaged or destroyed. At least 4 deaths were attributed to the 1935 Flood. Such a flood would have a tremendous negative impact on the County. Wastewater treatment plants and a large bulk fuel farm would be inundated, thereby creating potential public health emergencies, bridges would be destroyed and there would be large-scale erosion of soil from creek banks.

There have been many attempts to model flooding in the local watersheds. The end result can typically vary by a large margin. Rather than try to justify one evaluation over another, for purposes of the PDM Plan, it is more important that a worse-case scenario be presented. This provides the reader with a sense of how bad it can be. The reader must understand that this glimpse of reality is not a comprehensive look at the County but a sample of the damage floods can do throughout the entire region and County. This PDM Plan looks at the 1935 flood in the County and in Colorado Springs. The 1935 flood was documented much more than other major events and is representative of what can occur in the future for both the County and its municipalities.

The 1935 flood boundaries, high water elevations, and other parameters were determined based on the historical evidence. This was then mapped throughout the County. In addition present day photos were taken and overlaid against the boundaries of the 1935 flood.

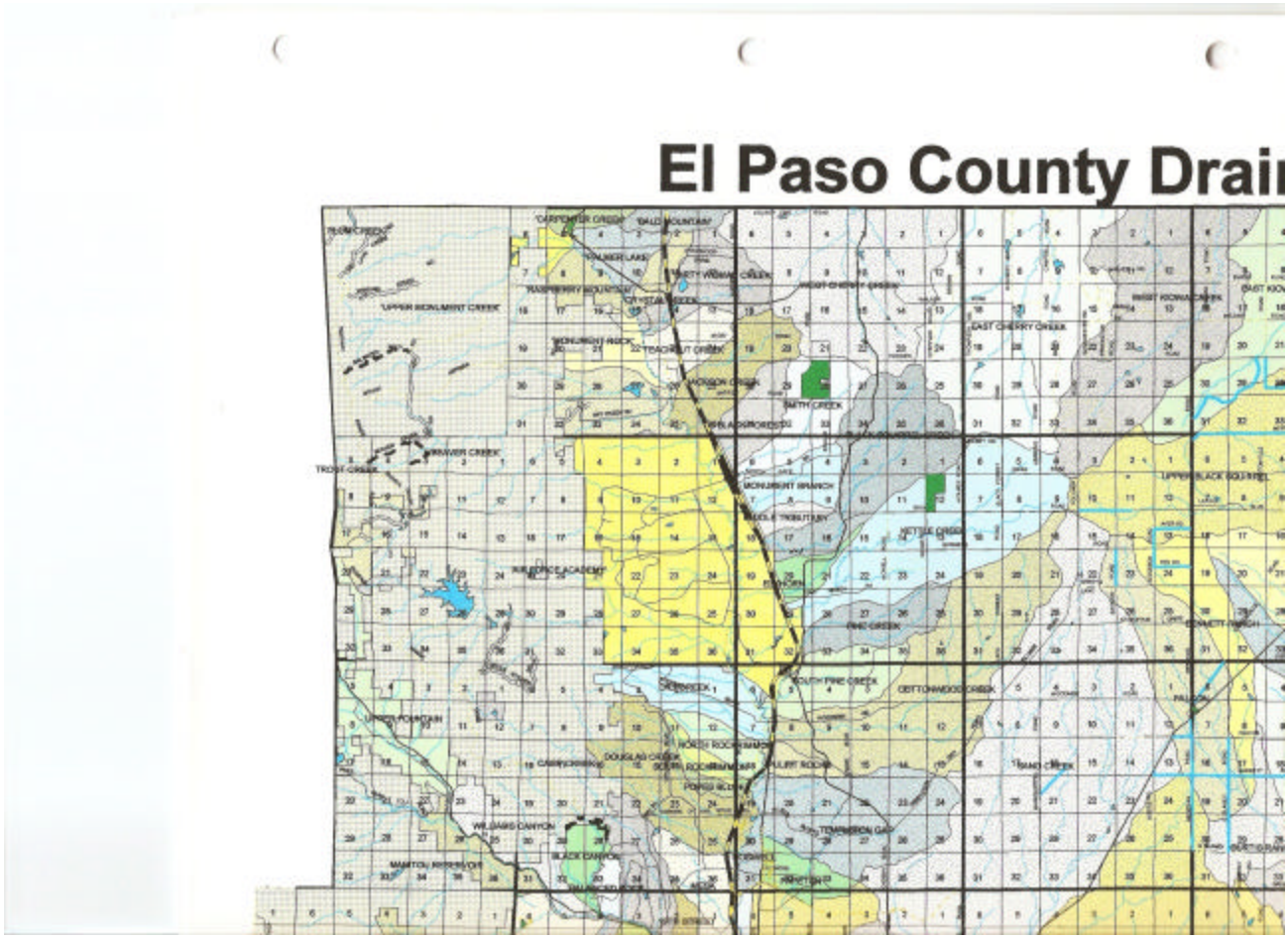
The following pictorial or graphical items follow this page and highlight the severity of the flood risk to El Paso County. Although most of the pictures are of areas that are now within the city limits of Colorado Springs they also depict several areas that are part of the unincorporated areas of El Paso County. These areas include Security and Widefield areas. If you extend the flood boundaries north the impact to new residential developments north of Colorado Springs including a large portion of the Tri-Lakes Fire Protection Districts is extensive.

1. Map of the various watershed within El Paso County
2. Photographs of the 1935 flood
3. The 1935 flood boundaries overlaid on present day El Paso County that depict the flooding of Fountain and Monument Creeks
4. Present day photographs with the 1935 flood boundaries and high water marks shown
5. Floodplain Regulation Flow Chart (Regional Floodplain Administration Office)
6. Pictures of the 1999 flood in El Paso County

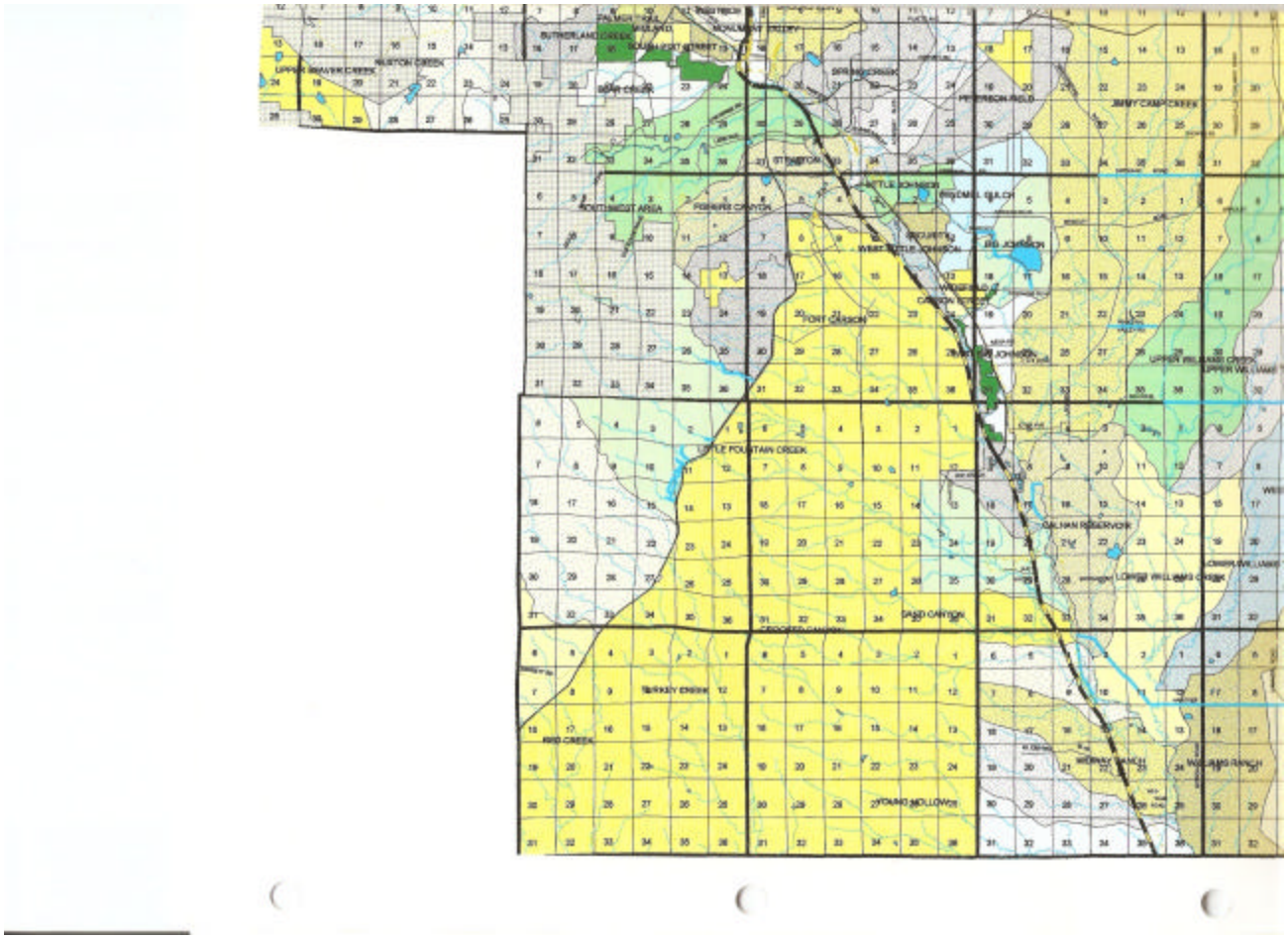
Map of Watershed in El Paso County

Watershed Maps are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.

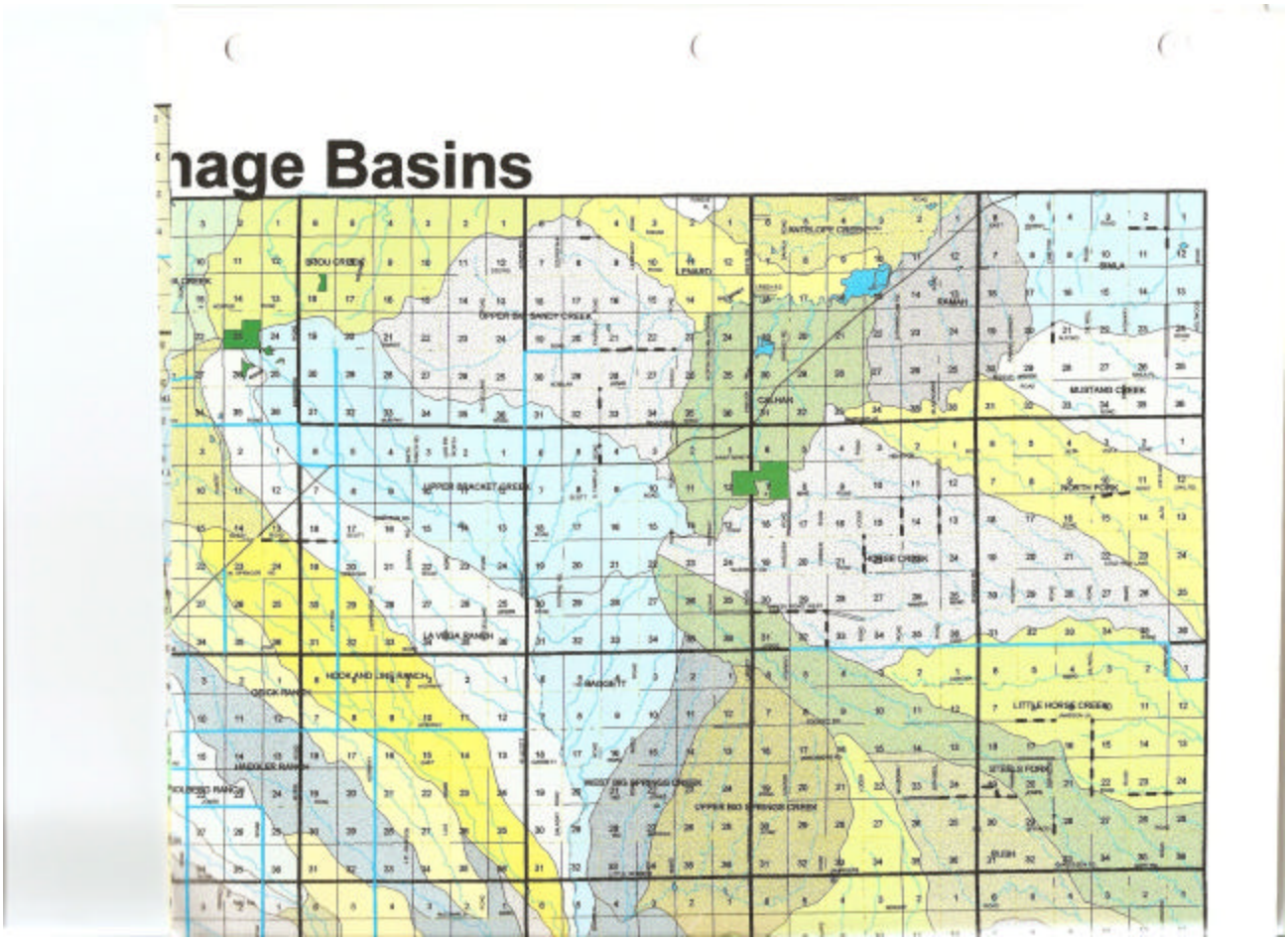
EPC Drainage Basin: Scan 1 (top left portion of map)



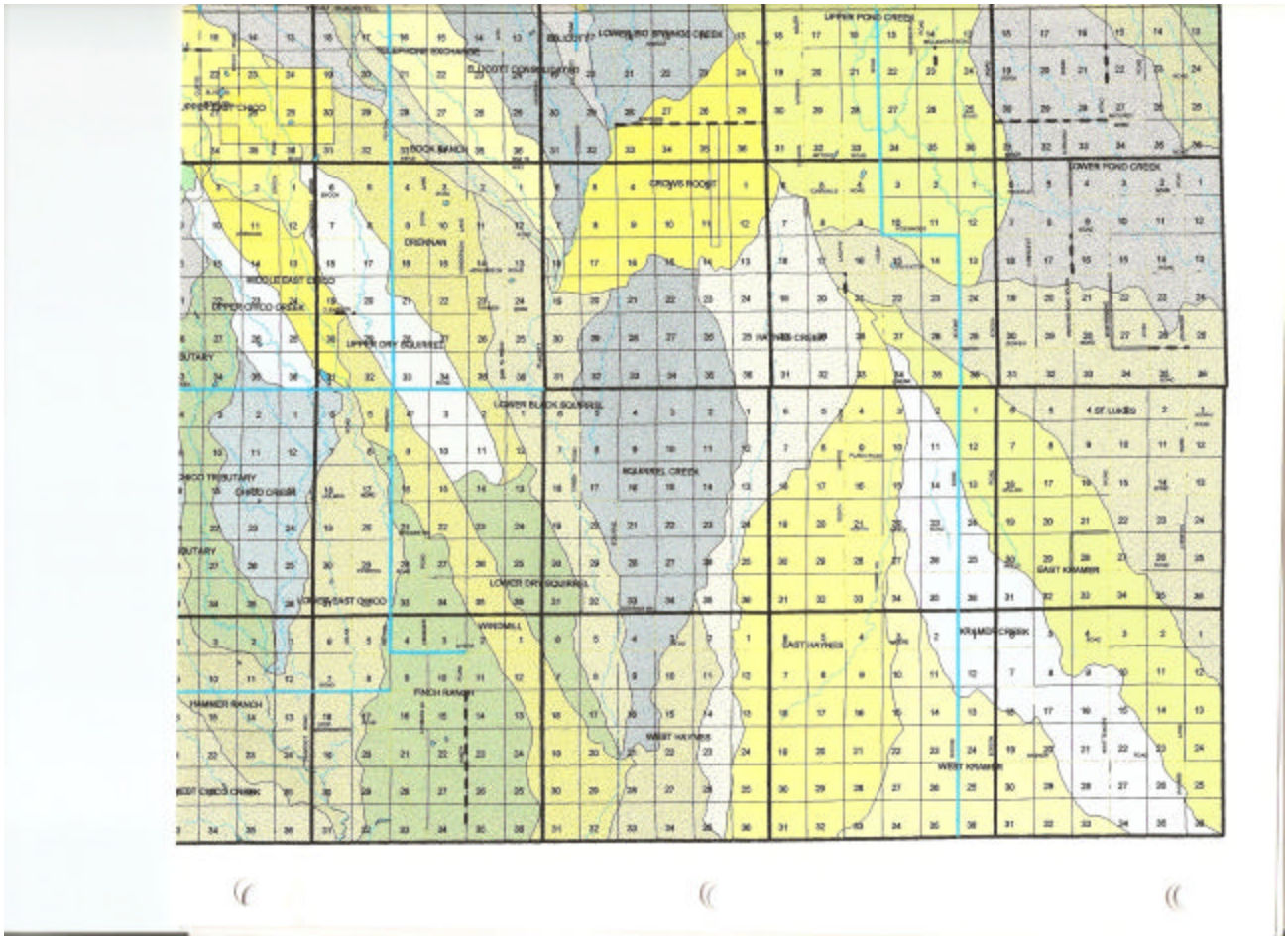
EPC Drainage Basin: Scan 2 (bottom left portion of map)

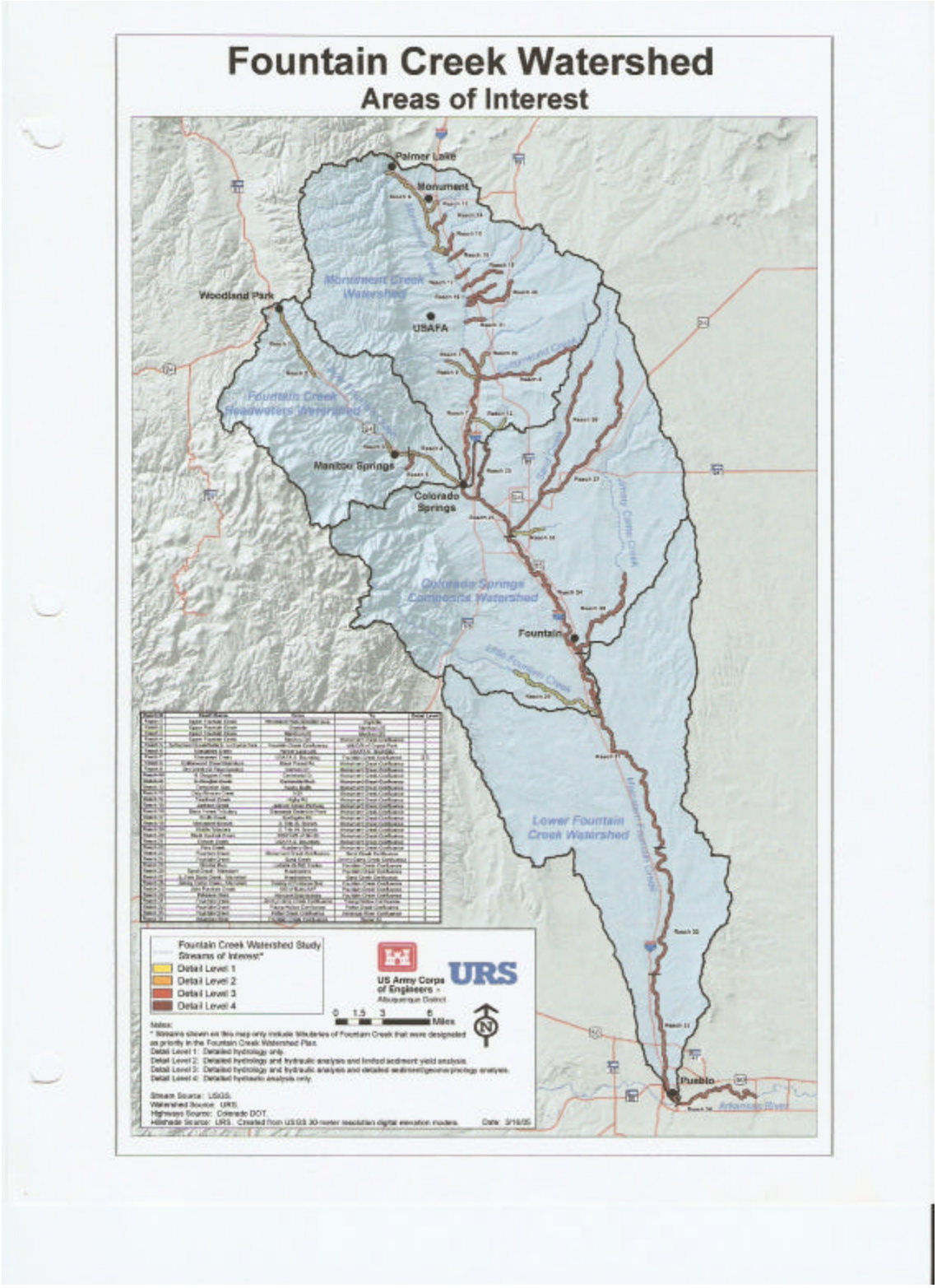


EPC Drainage Basin: Scan 3 (top right portion of map)



EPC Drainage Basin: Scan 4 (bottom right portion of map)




Fountain Creek Watershed
Areas of Interest
Palmer Lake
Monument
Woodland Park
USAFA
Manitou Springs
Colorado Springs
Fountain
Pueblo
Monument Creek Watershed
Fountain Creek Headwaters Watershed
Colorado Springs Composite Watershed
Lower Fountain Creek Watershed
Fountain Creek Watershed Study
Streams of Interest*
Detail Level 1
Detail Level 2
Detail Level 3
Detail Level 4
US Army Corps of Engineers
Albuquerque District
URS
0 1.5 3 6
Miles
N

The 1935 Flood in El Paso County

The 1935 flood on Memorial Day was one of the worst if not the worst flood of record for El Paso County. The PDM Plan intended to use this flood as a historical flood that actually occurred, which provides a sense of reality should it happen again. In investigation the flood and its effects it was found that the 1935 flood has apparently been underestimated in a number of subsequent studies. The flood was a result of heavy rain over the course of a few hours in the Monument Creek drainage area. The flood was a flash flood, starting early in the afternoon of May 30, 1935 and dissipating about 5-6 hours later.

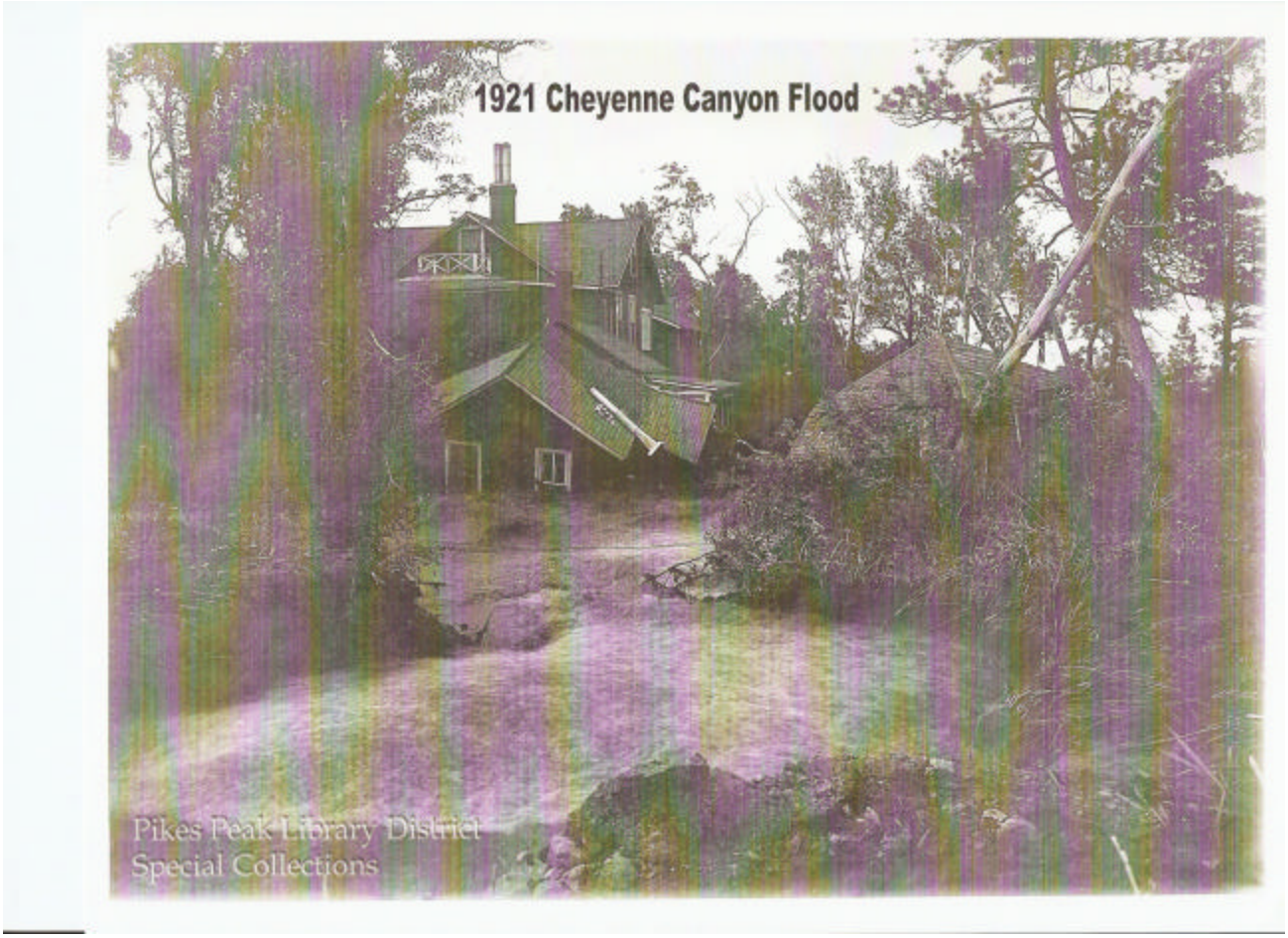
1935 newspaper articles as well as photographs from the Special Collection Section of the Pikes Peak Library District were used to determine the damage, location of the pictures, location of high water marks and determining the boundaries of the flood waters. In some cases depth of the water in areas adjacent to Monument Creek was approximately 5 to 6 feet higher than has been previously reported in some studies.

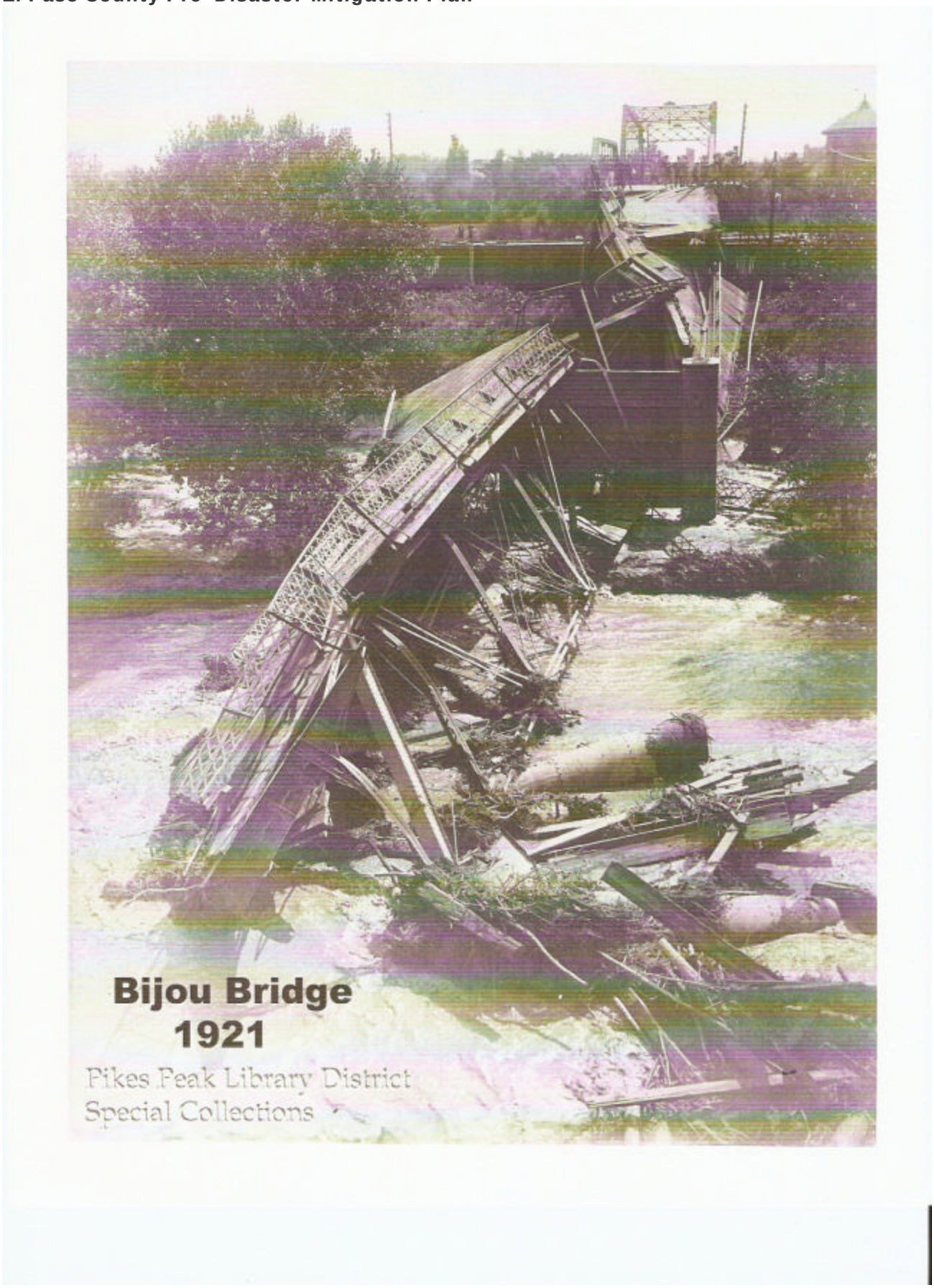
Water depth at the Midland Terminal Railroad Bridge was reported at 22 feet. In doing a back analysis it was determined that this is the same depth of water at Colorado Avenue. The 22 foot depth would have been reached, most likely, late in the afternoon of May 30, 1935.

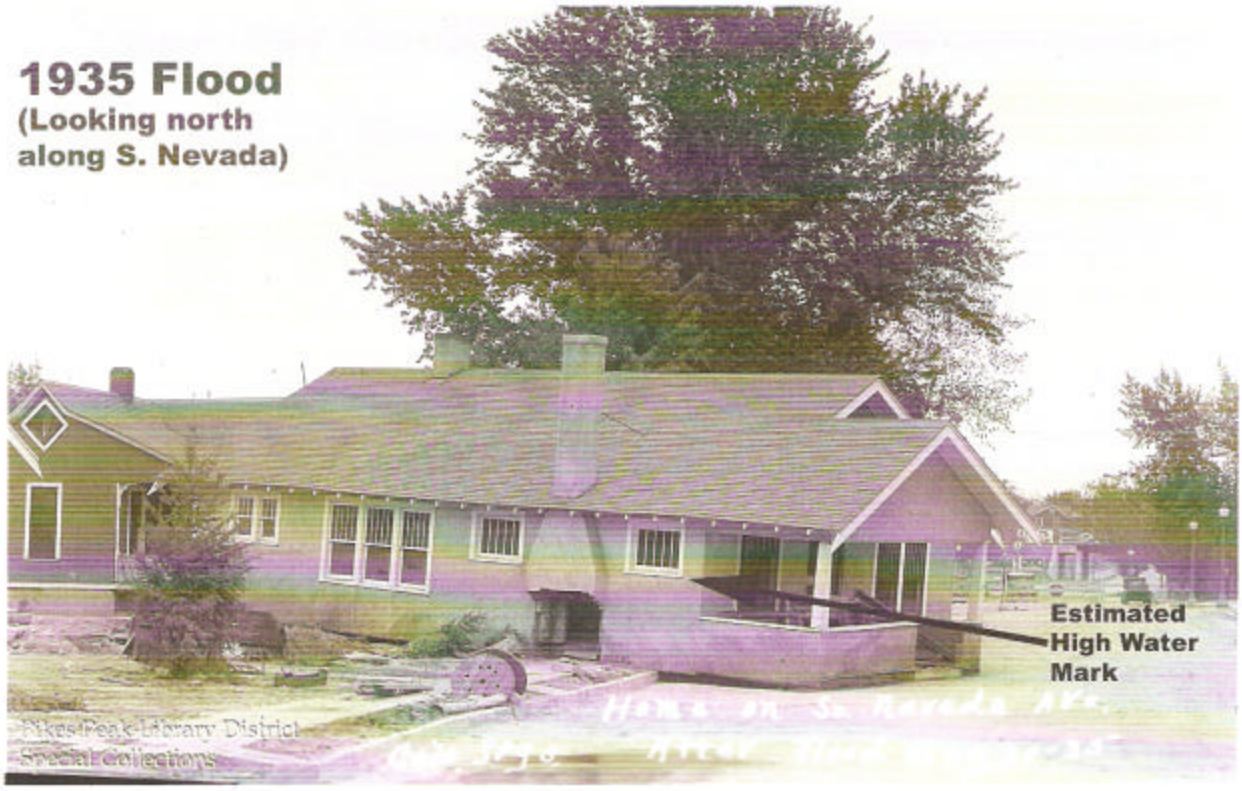
As a result of this analysis the flood's outer perimeter of flood waters is further away from the creek than originally anticipated.

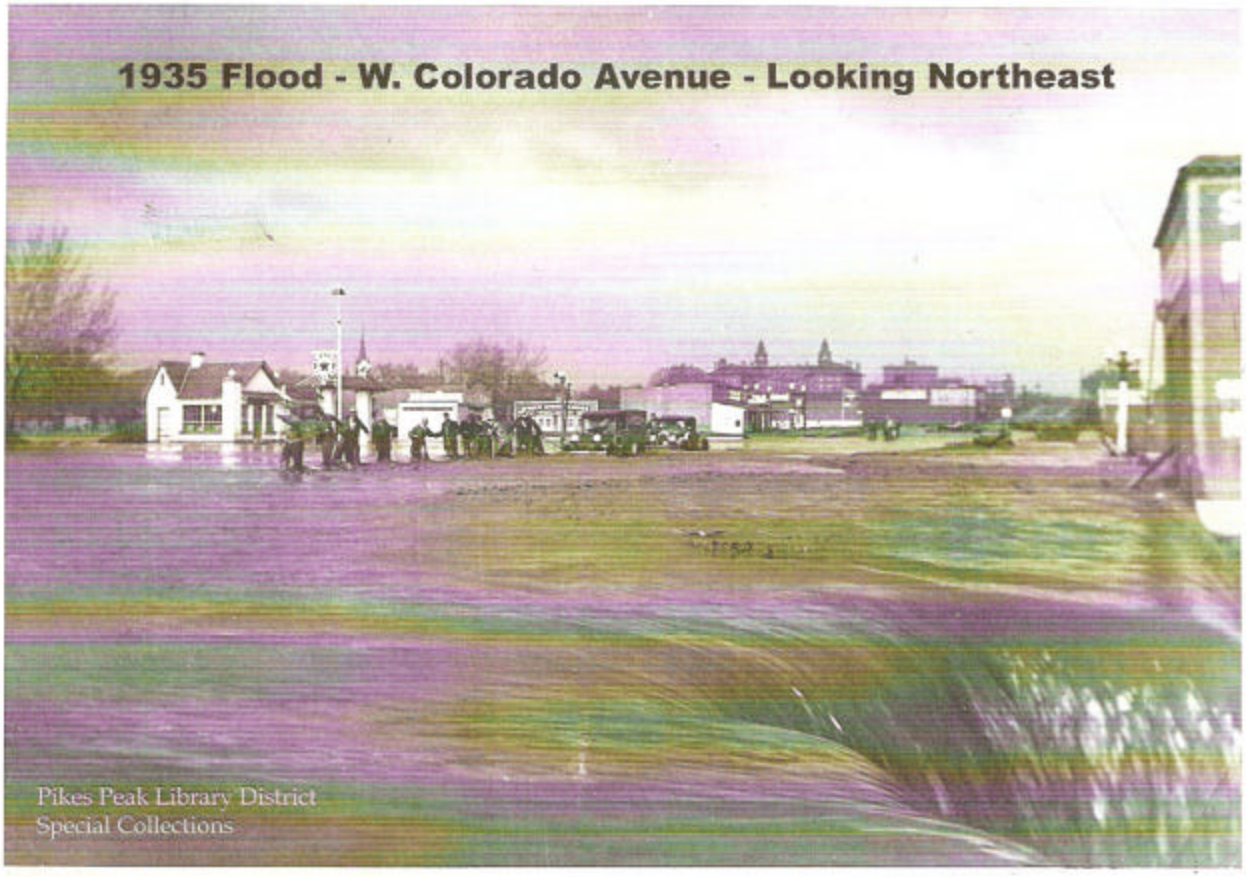
On the following pages are a number of photographs that were provided by the Special Collections Section. These have been annotated to provide additional useful information concerning the 1935 flood. There are also some 1921 flood photos that show the Cheyenne Canyon area as well as the Bijou Bridge. The Bijou Bridge was destroyed in 1921 and rebuilt.

More Photos are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.


1921 Cheyenne Canyon Flood
Pikes Peak Library District
Special Collections


Bijou Bridge
1921
Pikes Peak Library District
Special Collections


1935 Flood
(Looking north
along S. Nevada)
Estimated
High Water
Mark
Pikes Peak Library District
Special Collections


1935 Flood - W. Colorado Avenue - Looking Northeast
Pikes Peak Library District
Special Collections

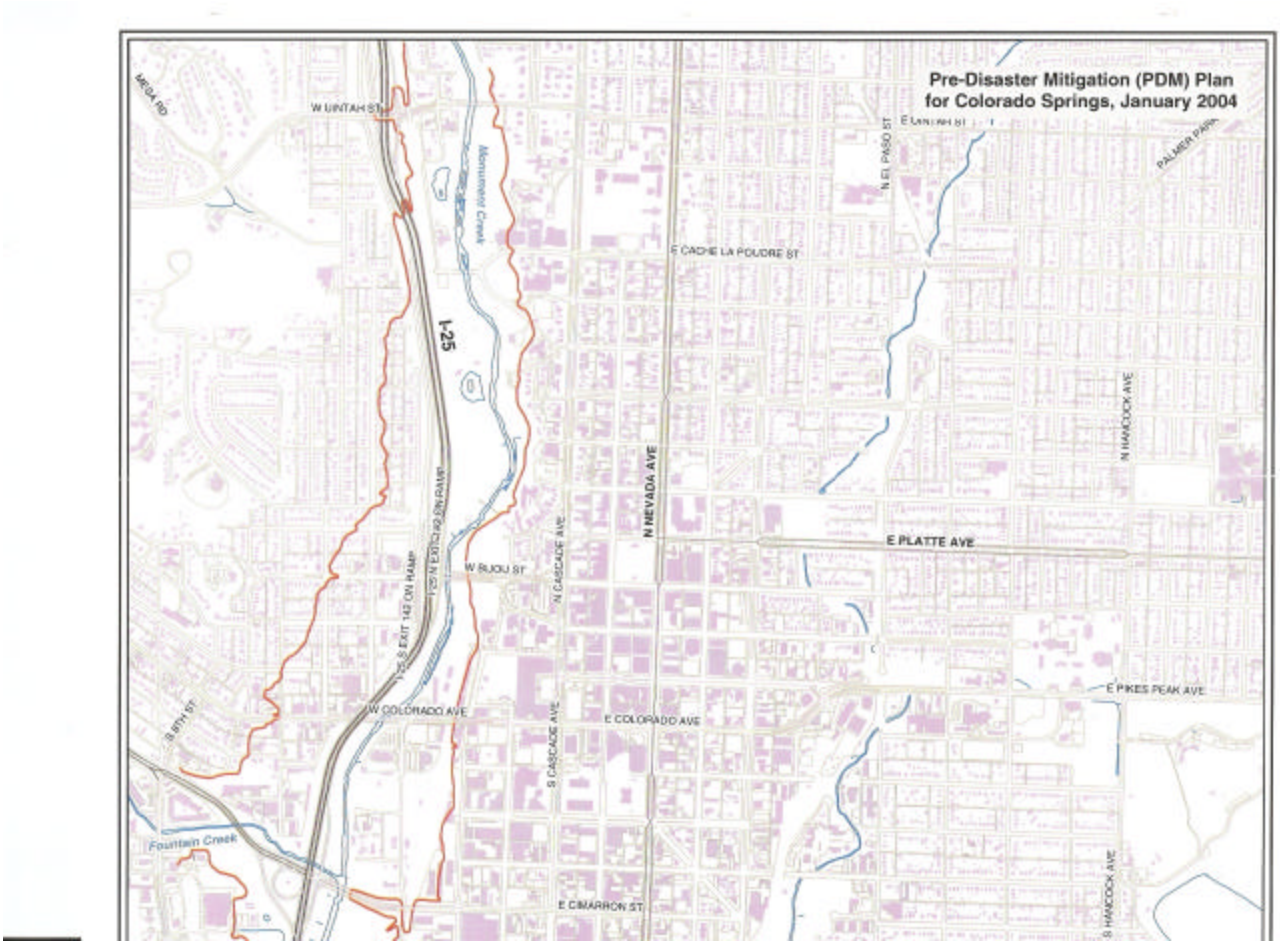
The 1935 Flood boundaries overlaid on present day El Paso County and Colorado Springs

The map that follows is an estimate of the size of the 1935 flood, if it were to occur today. There have been many changes since 1935 including the removal of some structures, construction of Interstate 25, construction of the Las Vegas Waste Water Treatment Plant, construction of the Vallero Bulk fuel farm, as well as other developments and construction. This flood roughly correlates to the Standard Project Flood (SPF) that was mapped in 1973 by the Corps of Engineers. In some areas the 1935 flood exceeds the boundaries of the SPF.

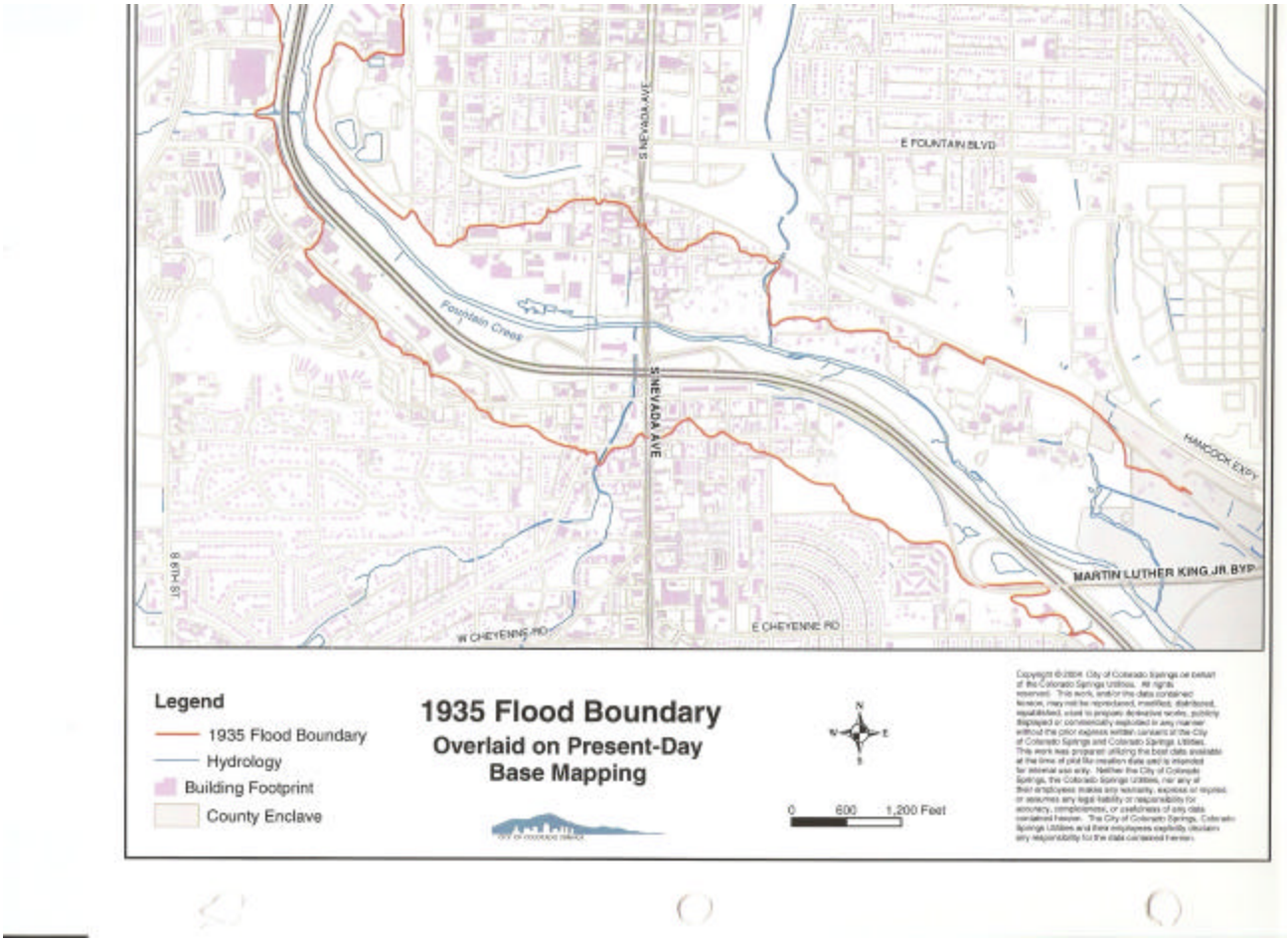
There are a number of critical facilities and buildings as well as residential structures in harm's way if the 1935 flood were to occur again.

Photos are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903 (719) 575-8401.

1935 Flood Boundary: Scan 1 (top of map)



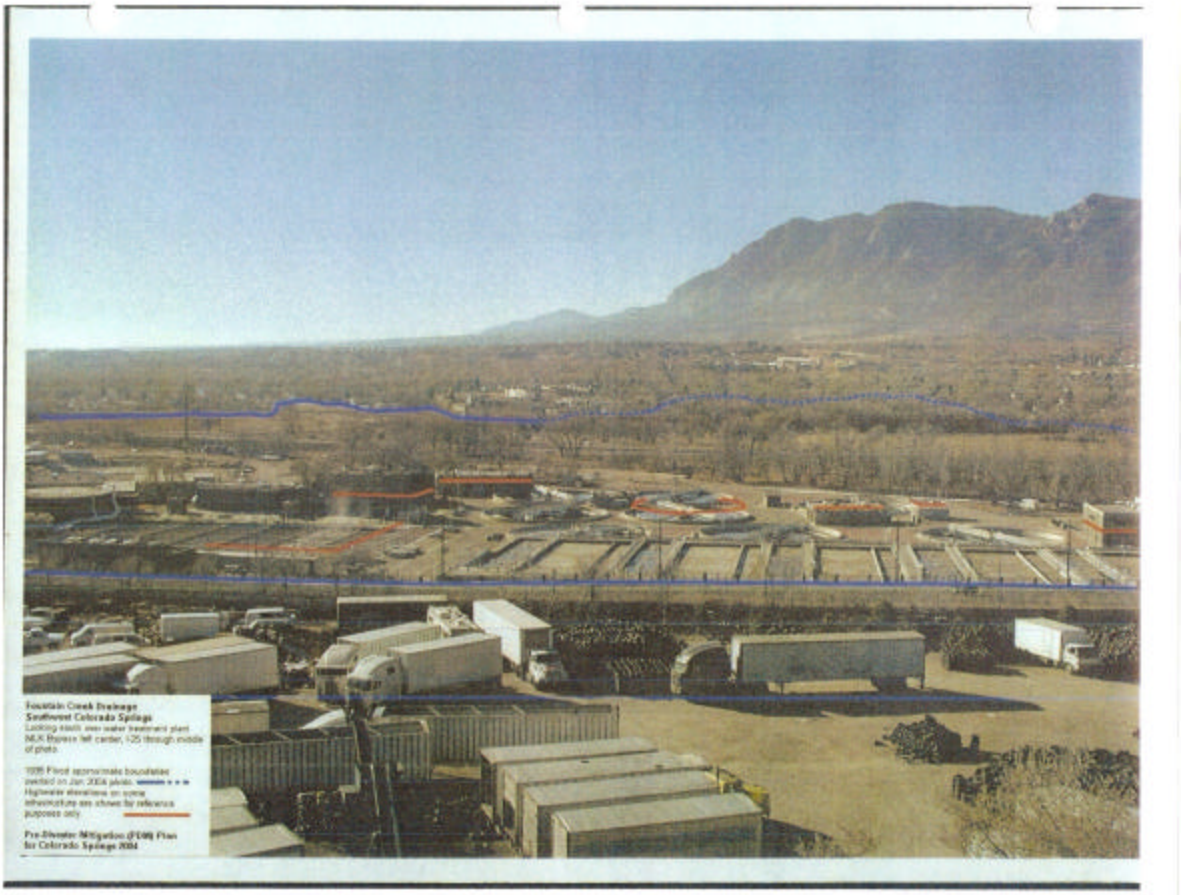
1935 Flood Boundary: Scan 2 (bottom of map)



Present day photograph with 1935 flood boundaries and high water marks

The photographs that follow are present day photographs of the Fountain Creek and Monument Creek drainage areas south and north of the junction of I-25 and Cimarron (Highway 24). The estimated 1935 boundaries are depicted in blue with the elevation of the flood shown on a few of the facilities and buildings as a red line.

Photos are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.


Fountain Creek Drainage
Southwest Colorado Springs

Floodplain Regulation Flow Chart

On the following page is a flow chart of current procedures utilized by the Floodplain Administration Office that is part of the Pikes Peak Regional Building Department.

Flow chart is available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.

Pikes Peak Regional Building Department

FLOODPLAIN REVIEW & PERMIT FLOW CHART

If property is located in or near a FEMA designated floodplain:

SUBDIVISION PLAT	FLOODPLAIN ZONE	LAND REQUIREMENTS	LOMR	PLAT INFORMATION REQUIREMENTS
	A - Proposed development		LOMR prior to plat.	Show FEMA approved floodplain boundary and flood elevation.
	AE -Proposed lots in flood fringe	Floodplain permit to elevate lots; No new lots in floodplain.	LOMR prior to plat.	Show FEMA approved floodplain boundary and flood elevation.
	AE - Proposed lots in floodway	No new lots in floodplain.		Plat floodplain as a NO BUILD zone tract.
	AO - Proposed development	Fill lots.	LOMR prior to plat.	Show FEMA approved floodplain boundary and flood elevation.

SINGLE LOT	PROJECT TYPE	REQUIREMENTS	FLOODPLAIN PERMIT	ELEVATION CERTIFICATE
RESIDENTIAL	Remodel less than 50 percent	Flood proof techniques to minimize future flooding; Meet construction codes as applicable.	Required	Required
	Remodel more than 50 percent	Must meet new construction requirements.	Required	Required
	New construction	Lowest floor raised 2 feet above FEMA flood elevation; Meet all current construction code requirements.	Required	
	Exterior improvement*	Design to withstand flood or break-away. Proof of retaining system.	Required	
COMMERCIAL	Remodel less than 50 percent	Use flood proofing techniques to minimize flood impact; Meet all construction codes as applicable.	Required	Required
	Remodel more than 50 percent	Meet all current construction code requirements.	Required	Required
	New construction	Lowest floor raised 2 feet above flood elevation or flood proof; Meet all current construction code requirements.	Required	Required
	Exterior improvement*	Design to withstand flood, or design to break away in a flood event. Provide proof of retaining system.	Required	

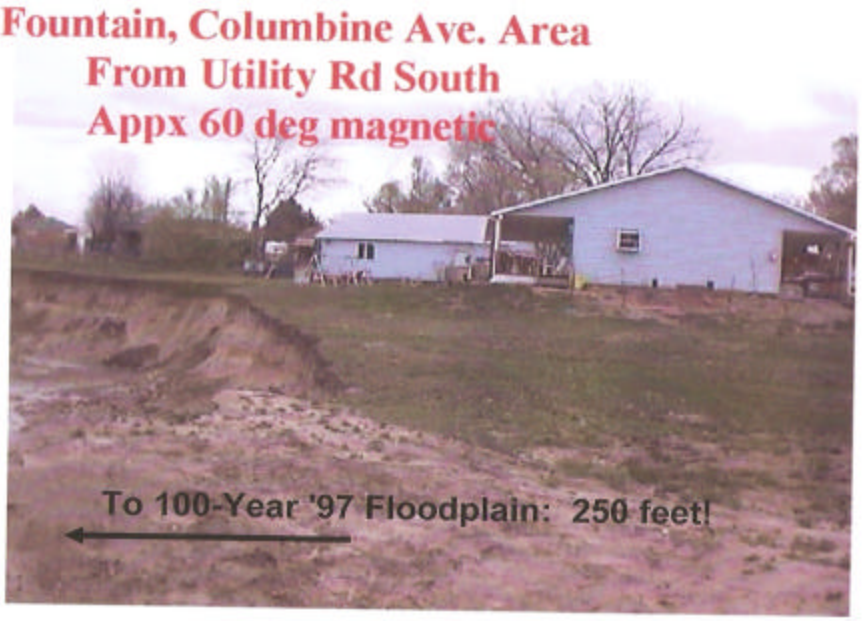
* **Exterior improvements** include changes to property (such as fill, excavation, landscaping, retaining wall, fence) and to structures (such as roofing, siding, deck, shed, etc.)

090103

1999 Flood Photographs

The damage caused by the 1999 flood is shown on several photographs that follow. The Corps of Engineers estimated that this event was equivalent to a 10-year event in the El Paso County area. These photographs highlight significant damage but damage that would be minimal compared to another 1935 flood.

Photos are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.



The 1999 Flood was estimated as a 10 year storm (Post Flood Assessment Report Arkansas River Southern Colorado by the U.S. Army Corps of Engineers (Albuquerque District) September 15, 1999), which is not a large flood. This picture and the preceding picture show the erosion problems that exist along Fountain Creek in El Paso County. Photo and graphics/wording provided by the El Paso County Office of Emergency Management

Photo and graphics/wording provided by the El Paso County Office of Emergency Management

Flood 99
BLASINGAME ROAD
N. OF HWY 24

Photo and Inset Text provided by the El Paso County Office of Emergency Management

There are a number of on-going initiatives and studies that are looking at the risk to the County and other jurisdictions posed by flooding in the watersheds, drainage basins, creeks and waterways. Numerous flood studies and reports have been reviewed as part of the PDM Project. The information provided in this Plan can only provide a glimpse of how serious the risk of a flood is to the County. Known high-risk areas still exist. Manitou Springs is only able to withstand a small storm event. The capacity of the Fountain Creek channel is 1,000 cfs in Manitou Springs and this equates to a 10-year storm event (Corps of Engineers Report, Post Flood Assessment Report Arkansas River Southern Colorado, 1999). Manitou Springs is especially susceptible due to the elevation drop of Fountain Creek along Highway 24 which allows for floodwaters to gain speed as they come out of the mountains. Other flood risks during a storm or flood include (but are not limited to) the rapid erosion of the banks of creeks due to higher flows in other parts of the County.

The storm drainage infrastructure for El Paso County varies from older undersized facilities and culverts to new subdivisions and roads that are designed to present-day standards for water discharge and flow. In many areas of the county there are drainage problems that have not been addressed that include erosion of stream banks, sediment transport, undersized structures, creek meanders and so forth. Other issues related to storm water flow are debris that results in a water flow blockage. As debris is carried by the fast moving water it has the potential to create more problems by either getting hung up on bridges or culverts causing a blockage or water flow restriction. This in turn affects a creek's hydraulics and, as a result, additional damage can occur that can include bridge or culvert collapse or a greater area of flooding due to water backing up behind the blockage.

In the 1935 Flood, houses and cars that were carried by the flood waters hung up on bridges and were the catalyst that destroyed other buildings or facilities and, in some cases, caused the death of several persons. The entire storm drainage system in the County should be considered a high priority resource because if it is not designed, constructed or maintained to the appropriate standards, then it compounds problems during a disaster. Many of the current issues with drainage in the County are due to a funding shortfall. This is a chronic problem that will only get worse with time unless solutions are developed.

The County has an automated flood warning system with sensors located at critical locations throughout the major drainage basins in the county from Falcon, west. These sensors are aging and will soon need to be replaced. Additionally, many tributaries are not monitored by flood sensors. This is especially the case in the eastern part of the county where most tributaries have not had any mitigation efforts initiated due to funding constraints. The other major problem with a flooding situation is in Manitou Springs due the lack of warning from an advancing flood. In their 1999 Report the Corps of Engineers estimated that the warning time would be between 15 minutes and 3 hours. Tourists in the summer are the most at risk because they may be unaware of the risk and unaware of an appropriate response.

El Paso County is home to a number of dams, damage to which could prove to be severely disruptive and even deadly to county residents as well as others. For example, among Monument's water areas are Woodmoor Lake Dam and Robinson Dam. Lake Moraine and Big Tooth Dam are located in the Manitou Springs region. Calhan houses the Big Sandy Dam and Fountain contains the Big Johnson Reservoir and the McCray. Any failure to the water regions surrounding Manitou Springs will have a tremendous impact on the Highway 24 corridor. The magnitude or severity of a future flood is not as easy to predict as the likelihood of a future flooding event. A wise course of action is to assume the worse and establish mitigation plans and other long-term planning based on a worse case scenario (e.g. repeat of the 1935 flood).

The entire geographical area that is located within 20-30 feet of an existing streambed is at the greatest risk of flooding. A major dam failure during a flooding event will obviously compound

the disaster. A dam failure is not considered in this part of the PDM but is addressed later. Conditions such as topography, soil characteristics, meteorological conditions, etc. make certain areas more prone to flooding. The saturation level of the ground, drought history, vegetation or lack thereof, precipitation rate, slope of the ground, stream bed condition, and capacity of culverts and the storm water sewer system are other factors that will help determine the potential magnitude of future flooding.

The numbers of Special Needs Population (SNP) facilities as well as critical facilities are limited inside the 100-yr floodplain. The highest risk is to the Waste Water Treatment Plant and numerous public water, sewer, and communication lines. There are no hospitals within the floodplain but the floodplain could potentially prevent residents located west of I25 from access to the hospitals that are all located on the east side of I25.

Future development is controlled by existing regulations (County Land Development Code) and the Comprehensive/Master Plan but existing structures will be at risk unless removed from the floodplains. All activity in the floodplain is controlled by the Floodplain Administration Office (FAO) that is part of the Regional Building Department. The FAO works with the Corps of Engineers with respect to permitting activities. Currently the Regional Building Code (313.19.1) requires that any structure that is planned to be built in the 100-year floodplain must obtain a building permit. The permit requires that the "structure shall have the lowest floor, including the basement together with attendant utility and sanitary facilities, elevated one (1) foot or more above Base Flood Elevation (BFE)." Additionally, RBC 313.18.7 requires that "All fill placed within the 100-year floodplain must be properly designed and compacted to ninety-five (95%) (ASTM-D698 equivalent or higher standard) with appropriate protection from erosion and scour." Where floodplain data is not available the Base Flood Elevation must be determined by a professional engineer licensed by the State of Colorado. Any conversion of habitable space is classified as new construction and must meet floodplain building codes.

There are a total of 1749 structures located inside the 100-year floodplain inside El Paso County. This number includes 1083 inside the limits of Colorado Springs, 163 in Manitou Springs, 19 in Calhan, 20 in Fountain, 117 in Green Mountain Falls, 19 in Monument, with the remainder (328) located in unincorporated areas of the El Paso County. There current value of these structures is difficult to ascertain due to fluctuations in property values but it is estimated that the value is approximately $366M. There are currently 4 repetitive loss structures in the unincorporated area of El Paso County while Manitou Springs has 2 and the city of Colorado Springs has 5. El Paso County has had only one Presidential declared disaster that was in 1999. Since this was the only flood induced declared disaster there are no repetitive loss structures that fall under a declared disaster. But of these repetitive loss structures one structure has 4 recorded claims, one has 3 recorded claims, and the remaining structures have two recorded claims under the NFIP program. The County's Floodplain Office tracks repetitive loss structures for purposes of enforcing RBC 313 which tracks the cumulative loss of each structure from floods. When the value of the loss exceeds 50% of its market value the structure must be restored to meet RBC 313 (e.g. lowest floor 1 foot above BFE and flood-proofing).

The County is, and will continue to be, a participant in the National Flood Insurance Program (NFIP). The County Floodplain code currently meets or exceeds NFIP criteria. This includes the requirement for permits to build within the floodplain and specifies the criteria for building (Regional Building Code 313). The County Floodplain Manager is currently involved in a FEMA sponsored Floodplain Map Modernization Program that will provide updated information on the 100-year floodplain. Additionally, each year the Floodplain Manager provides the public information on flood safety. A copy of the most recent public information flyer is located in the appendices.

Fountain and Monument Creeks are the largest creeks in the county and within the Fountain Creek Watershed (FCW). Large flood events in these creeks have caused severe damage to public and private infrastructure, utilities, adjacent farmlands and residential communities. The FCW encompasses 927 miles and covers 11 municipalities and parts of 3 counties. There are currently two working groups that are focused on the Fountain Creek Watershed that are the Fountain Creek Watershed Technical Advisory Committee (TAC) and the Fountain Creek Watershed Vision Task Force. The TAC and the Vision TF consists of representatives from 3 counties (El Paso, Teller, and Pueblo) and 8 municipalities (Monument, Palmer Lake, Manitou Springs, Colorado Springs, Green Mountain Falls, Woodland Park, Fountain and Pueblo), State and Federal agencies, landowners, public representatives, County Commissioners, utility company representative, environmental experts, emergency managers, and others that have expertise or an interest in the heath and future of the Watershed. The overall intent of these groups is to build a Strategic Plan for the Watershed establishing projects and funding to support the plan. The Strategic Plan will include flood mitigation, water quality and environmental issues as well. The future issues that both groups are working on include improving policies, restoration opportunities, water quality, wetlands, and other environmental issues. The two groups work hand-in-glove to improve the Watershed.

One on-going project that is near completion is the Corp of Engineer Study of the Watershed Study. The study was initiated in 2003 and is expected to be completed in 2008. The objectives of the study were to document the characteristics, general conditions, and health of the Watershed and to identify methods to reduce flooding, reduce sedimentation, and reduce erosion. The reduction of sedimentation and erosion will ultimately improve water quality. The results of the study are currently being studied with the intent to identify areas where restoration projects would be feasible and beneficial. The TAC has identified critical projects and prioritized them. Under consideration are flood risk reduction projects (Highway 24 corridor including Manitou Springs, Upper Monument Creek and Cheyenne Creek as well as bridge over-toppings), ecosystem restoration (Jimmy Camp Creek, Clear Springs Creek, and Fountain Valley Park vicinity), and channel stabilization (Monument Branch, Upper Cottonwood Creek and East Fork of Sand Creek) as well as potentially changing policies to address flooding, erosion, and sedimentation problems. These includes potential policy changes that would allow for more open space needs, limit sediment sources, reduce sediment transport, and encourage low impact development. Other potential projects include rehabilitating riparian areas, preserving existing, and creating more, wetlands that can reduce the impact of flooding in the Watershed.

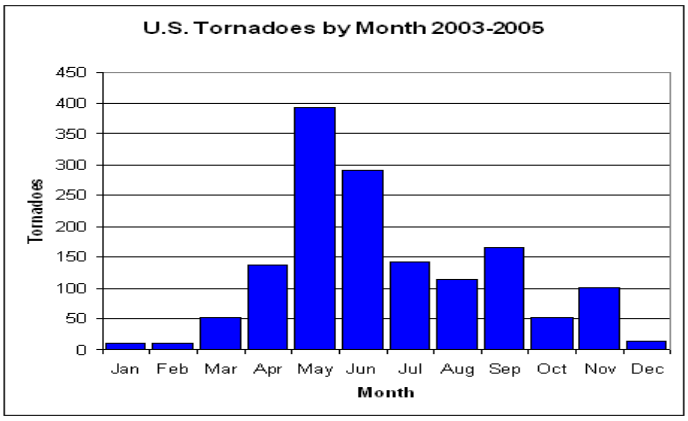
Based on the history of El Paso County future floods will occur. The greatest impact will occur in those creeks and tributaries that have not had mitigation efforts completed to stabilize creeks banks, avoid blockages, or remove large deposits of sediment that can increase the impact of a flood. At risk is the loss of homes, businesses, and critical infrastructure that are within the flood plain, loss of agriculture land as banks are eroded, and damage to infrastructure that lie within the floodplain.

High Winds / Tornado

The El Paso County area is subject to frequent, often intense gusts of high winds. Although they are not usually life-threatening, high winds can disrupt daily activities, cause damage to buildings and other structures and increase the potential of other hazards. In 1998, strong winds gusting up to 96 mph around the region damaged many homes and blew over a semi-trailer on highway 115. Some areas with little ground cover experience blinding gusts of dust and road debris, which becomes a hazard for travelers and an occasional disruption for local services. High winds in the winter sometimes cause complete whiteouts and create significant snowdrifts and transportation disruptions. High winds can accelerate wildfires, which can cause grave danger to firefighters, emergency response personnel and residences or other structures,

which happen to be in their path. Damage to structures happens regularly due to high winds but it is usually minimal and goes unreported. Effects of the high winds may be seen in roof damage, cracked windows and damage to trees and landscaping.

A tornado is a violent and extreme extension of the high wind hazard, characterized by a twisting, rotating column of air with a funnel-shaped cloud extending from a thunderstorm to the ground. Tornadoes may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. They can be one mile wide and stay on the ground over 50 miles. The average forward speed is 30 mph, but may vary from nearly stationary to 70 mph. The strongest tornadoes have rotating winds of more than 250 mph and are capable of causing extreme destruction. Typically, tornadoes cause the greatest damages to structures of light construction such as residential homes and, particularly, mobile homes.



In Colorado, tornadoes are most often caused by thunderstorm activity when cool, dry air meets and overrides a layer of warm, moist air. This forces the warm air to rise rapidly. Damage caused by a tornado is the result of the excessive wind velocity and wind-borne debris. Lightning and large hail is a frequent byproduct of these serious windstorms.

In an average year in the United States, 800 tornadoes will cause 80 fatalities and 1,500 injuries nationwide. Tornadoes come in all shapes and sizes and can occur at any time of the year although they are most frequent east of the Rocky Mountains during the spring and summer months. Effective 1 February 2007 tornadoes are gauged on the Enhanced Fujita Intensity Scale that measures tornadoes on an F-scale from 0 (least intense) to 5 (most intense). The Enhanced Scale is a set of wind estimates based on damage. The definition of each is below:

Enhanced F Scale for Tornado Damage

An update to the the original F-scale by a team of meteorologists and wind engineers, to be implemented in the U.S. on 1 February 2007.

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**

0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

***** IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS:** *The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage.* Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. **Important**: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.

According to the state's reports of Windstorm events, 16 reported incidents of high winds occurred in El Paso County between January 1, 1993 and July 31, 2000. No deaths or injuries were reported, and damages from the events totaled $1.7 million.

Colorado ranks 9th among the 50 states in frequency of tornadoes, but 38th for the number of deaths. Colorado ranks 31st for injuries and 30th for the cost of repairing the damages due to tornadoes. When these statistics are compared to other states by the frequency per square mile, Colorado ranks 28th and 37th for both injuries per area and costs per area.

Between 1950 and 1995 Colorado experienced 1,161 tornadoes, which caused 2 fatalities. The risk of death from tornadoes in Colorado in any one year is 1 in 49,715,910. Between 1950 and 1995 the state had 157 injuries involving tornadoes, and the total cost of their damage was placed at more than $68 million. Tornadoes have been reported nine months of the year in Colorado, with peak occurrences between mid-May through mid-August. June is by far the month with the most recorded tornadoes. Tornadoes occur at all times of the day, with more than half occurring between 3pm and 6pm, and about 88 percent occurring between 1pm and 9pm MDT. The topography of El Paso County limits the occurrence of most tornadoes to the central and eastern portion of the county but they can occur statewide. As an example a tornado occurred on the western edge of the County in the mountains north of Green Mountain Falls during the summer of 2007. Damage consisted solely to forested areas.

On March 28, 2007 an F4 tornado struck Holly, Colorado. The tornado cut a swath 2.2 miles long and 600-feet wide path through the small town killing one woman and injuring 11 others. Holly, located on the eastern plains of Colorado, is home to about 1,000 residents. The streets in the small town were littered with power lines, tree limbs and other debris. Ranchers in the area lost several head of cattle to the storm. The National Weather Service had issued a tornado warning at 8:02 p.m. and the twister was spotted nine minutes later. However, emergency response officials said the community was hit without warning, and that tornado sirens never sounded. Of the 164 damaged houses, 48 of them were destroyed or damaged so badly that they were not habitable. The Governor approved sending 50 mobile homes and travel trailers to help provide housing to Holly residents.

The majority of tornados occur to the east of Colorado Springs in the vicinity of the towns or communities of Ellicott, Peyton, Calhan, and Yoder. Since 1995 El Paso County has had 18 tornadoes of which 2 were Category F2, 3 were F1, and 11 were F0. On May 28th, the Memorial

Day Monday holiday, 2001 an F2 tornado touched down near the town of Ellicott destroying over 30 homes, damaging another 70, and severely damaging the Ellicott High School. Had the tornado occurred during a school day, there would have been a significantly higher number of injuries or deaths.

It is difficult to determine the value of losses due to a tornado. Losses as a result of the Ellicott tornado are difficult to determine as the structures lost were all private residents that were covered by private insurance. There were a total of 108 homes that were destroyed. With an average value estimated at $80,000 the loss is estimated at $8.6M. If the storm track for this tornado were to be overlayed in some of the newer housing developments located east of Colorado Springs the loss of the same number of houses would exceed $20M in the Falcon area to $35M in the Black Forest area.

Based on historical weather conditions it is certain that El Paso County will endure more tornados in the future. Although tornados can occur anywhere in the County they are most predominate in the eastern areas of the county. Mitigation efforts rest primarily in public education programs to provide advice to residents, school administration, and business personnel of what to do during a tornado, and in improving the public warning system in the county. This public warning system includes the appropriate and timely use, and expansion, of the siren system located in various parts of the county but also includes public radio and TV channels. This education program must also focus on the large number of tourists by providing public service announcements via TV and radio as well as insuring that the media advises people of what to do during a tornado warning and watch.

Snowstorms

Snowstorms and/or Blizzards are the natural hazard that El Paso County residents and visitors to the county experience the most. Of the last 5 county-declared disasters and emergencies, three were snowstorms. Storms tend to develop over southeast Colorado in the lee of the Rockies. These storms move east or northeast and use both the southward plunge of cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce heavy snow and sometimes blizzard conditions.

Heavy snow has immobilized the El Paso County region in the past, paralyzing the region, stranding commuters and livestock, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow have collapsed buildings and taken down trees and power lines. In rural parts of El Paso County, homes and farms may be isolated for days, and unprotected livestock may be lost. In the mountains, heavy snow leads to deadly commuter roads and avalanches. The cost of snow removal, repairing damages, and bss of business has large economic impacts.

In 2003, El Paso County was one of 29 Colorado counties that experienced a Presidential Snow Emergency Declaration due to the massive winter storm of March 16-20. This declaration was the only one of its kind to impact the county to that point, but it underscores the potential such winter storms have to significantly affect residents, critical infrastructure and services as discussed in the Risk Assessment section of this report. According to the Colorado Department of Local Affairs, 181 “heavy snow” events were recorded in El Paso County between 1993 and 2004.

Other examples of the typical snow blizzards that occur in the County was exhibited in December 2006 when back-to-back blizzards and subzero temperatures created disastrous conditions for residents, livestock, and the economy. These snowstorms created whiteout conditions and drifts that were in excess of 14-15 feet. Ranchers lost 10,000 to 15,000 head of livestock across the southeastern corner of Colorado. The storms closed Interstate 25 for

several days, stranded residents and cattle herds for days. The impact could be felt in the stores within the county with grocery stores empty, or near empty, of all water and food for several days. Local food banks were distributing food as required throughout the county. In many cases it was over 10 days before snowplows were able to reach many residents within the county. These storms ultimately created serious problems with road conditions following the storm. Large and frequent potholes created dangerous driving conditions and the county was forced to utilize a significant amount of its annual repair budget following these storms. In March 2007, although not a declared disaster or emergency, another snowstorm hit the County by surprise. The weather pattern was expected to miss the county and was not expected to be to the level of intensity that occurred. The fast moving storm created whiteout conditions, snow drifts in excess of 12-14 feet downing power lines and knocking out power to over half the County. Since the storm intensity and speed was unexpected many schools and businesses did not close early releasing students and employees before the storm hit but rather released these people after the storm was already at its height. This placed an enormous amount of people and kids on the roads at the height of the storm. In the first 90 minutes the County EOC received over 150 rescue missions for stranded motorists. One call alone was for over 40 vehicles stranded at the intersection of Falcon and Curtis Roads. There were a total of 6 school buses from the Miami-Yoder School district that were lost in the storm with the OEM declaring the top priority to be the locating and rescue of the children on these buses. At that time a large number of County assets were dedicated to finding the 6 school buses some of which were trapped between downed power lines. Over the next 14 hours hundreds of motorist and kids were rescued by Volunteer Fire Departments, the County's Search and Rescue Unit, and National Guard Snowcat Teams and placed into shelters. Mountain View Electric, challenged with the largest power outage in the history of the Company (and the County), provided remarkable service by restoring power to County residents within 5 days. Resupply of food and other commodities into the county were severely impacted for over 5 days with many stores and restaurants running out of food and other necessary items.

One of the challenges in El Paso County is the difference in weather conditions within the City of Colorado Springs and in the area outside the City. The effect of snowstorms tends to be minimal in the city while in the unincorporated areas of the County the conditions are extremely dangerous due to drifting, low temperatures, and whiteout driving conditions. This condition directly attributed to the large number of stranded motorists during the March snowstorm as within the City the sun was actually shining yet in the County snowdrifts were rapidly reaching over 10 feet in the first hours of the storm. With the majority of residents working within the City of Colorado Springs there was a general disbelief by residents to leave work early or stay at work until the storm passed. This created the enormous number of stranded residents on roads outside the City. A large number of roads in the County do not have road barriers that can be used to close roads so despite best efforts by the County Sheriff residents would continue down roads that had been closed. This greatly attributed to the large number of stranded motorists.

Snowstorms are a recurring fact of life within El Paso County. Despite the County's efforts to provide public education on emergency preparedness it is still challenged with those residents that are ill prepared or disregard advice from County officials. El Paso County has a large influx of residents from other states primarily the South and west coast areas where snow is not a life-threatening factor. Their ignorance in the dangers of snowstorms is a continuing challenge for first responders. An additional problem that creates rescue difficulties as well as life threatening conditions is the lack of cell phone coverage in a large portion of the County.

The impact to county residents, businesses, and ranchers can be slight to extreme depending on the extent of the blizzard. The greatest impact is to ranchers who have the potential to lose large number of animals and businesses that are reliant on the trucking industry to resupply their stocks. Loss of electrical power can compound the effects of a blizzard causing loss of

perishable foods, create health issues for those that are homebound with medical needs (e.g. oxygen generators), loss of revenue by businesses that remain closed due to power outage, etc.

Lightning

According to experts in the field of natural hazards, lightning is the most dangerous and frequently encountered weather hazard that most people experience each year. Colorado ranks number 11 for lightning deaths in the United States. From 1980 to 2006, lightning strikes have injured 378 individuals and killed 80. It is the second most frequent killer in the United States with nearly 100 deaths and 500 injuries each year. (Floods and flash floods are the number one cause of weather related deaths in the US). According to the National Oceanic and Atmospheric Administration (NOAA) an average of 67 people in the United States are killed each year by lightning, which is typically more than the numbers killed annually by tornadoes or hurricanes.

Lightning is the leading summer weather-related killer in Colorado. Hikers and climbers in the mountains of El Paso County who are caught in lightning storms are in particular danger, as are children at play in open areas. While lightning frequently accompanies thunderstorms, the presence of a thunderstorm is not necessary for lightning to occur. Lightning can strike as far away as 10 miles from any precipitation. Tourists who travel to the region are often surprised by the speed with which a thunderstorm can build in the mountains, and they can easily be caught in a storm while traveling in El Paso County.

El Paso has one of the highest lightning strike risks in the State of Colorado, and the United States, with an average of 27,500 strikes per year. One of the biggest challenges for the County's Search and Rescue Team is the rescue of hikers on Pikes Peak each year. Storms can move into the area at alarming speed and trap hikers on the mountain. Most years there is at least one, if not more, unfortunate deaths from hikers being hit from lightning while hiking Pikes Peak or in the surrounding Pike National Forest.

The impact of lightning strikes is generally limited to the unfortunate individuals that are stuck by the lightning, and to electrical equipment in residents and businesses that are destroyed or damaged by lightning strikes.

Overall severe weather is a hazard to all residents, businesses, and tourists within the County. Large snowfalls coupled with high winds create conditions across the county that can strand large numbers of residents and stop critical transportation across the Midwest. The eastern part of the county is significantly more affected by tornadoes than the western part of the County. Lightning is a threat regardless of your location in the County. Flash floods are a severe hazard along the Monument and Fountain Creeks as well as along the many tributaries throughout the County. The probability of continued occurrence for severe weather is certain. If the trend over the last two years is any indication, the occurrence may even be increasing either due to normal weather patterns over thousands of years or due to global warming.

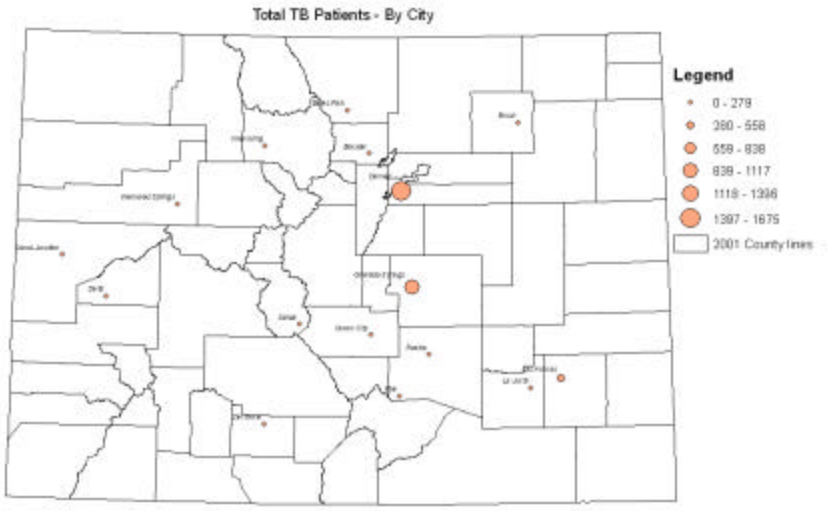
PANDEMIC DISEASE

The epidemic hazard for humans may be considered somewhat greater than that of most other communities in the state due to the steady stream of visitors to El Paso County. Many of these visitors travel frequently and widely. Fortunately, there has been no major disease outbreak in the area in recent memory. Further, the county and municipalities have implemented contingency plans and protocols to enable rapid response to, and control of outbreaks if identified.

Data is not available to estimate losses associated with the epidemic hazard for humans in the El Paso County area; however, all persons who reside in the area are theoretically at some risk of developing a disease in the event that an outbreak occurs. Damages and losses that might accompany the epidemic hazard as related to human disease outbreak are primarily limited to effects on human populations and health and would not typically affect structures, utilities or transportation. Impacts on public health and safety facilities could occur, but some structures, furnishings and belongings that come into contact with a diseased person may need to be destroyed should these resources be considered infectious.

Primary damages or losses associated with an outbreak or outbreaks could include economic losses associated with work absences or a decrease in productivity due to disease; human losses associated with disease and fatality in the community, adverse impacts on hospitals and other health care facilities and staff, and the fear and anxiety associated with a severe outbreak.

El Paso County and the surrounding counties have had periodic outbreaks of disease including West Nile Virus, as well as two cases of drug resistant Tuberculosis (TB). The TB resulted in the death of a college student. The viruses that appear to threaten residents the most are TB, Hepatitis, Chicken Pox, and the annual Influenza with 348 cases of Hepatitis B and C, 127 cases of Chicken Pox, and 85 cases of Influenza that resulted in hospitalization being recorded. West Nile Virus is of concern, as it is the most common local virus that has the potential to cause significant numbers of deaths. Although in 2006 El Paso County only had 5 cases of West Nile, state-wide, since the first death was recorded in 2003, 76 Coloradoans have died from West Nile Virus. Seven deaths were reported in 2006, with the first death occurring in August 2006. To date, 72 cases of West Nile virus have been reported to the state in 2007. It is anticipated that this number will continue to rise as new cases are being reported daily. While most infections don't cause illness or are less severe, these deaths clearly demonstrate that West Nile virus can have serious, potentially fatal consequences. TB in El Paso County is an issue with the City of Colorado Springs and El Paso County having a higher than average rate within the State. The map below depicts the TB statistics by city in Colorado with El Paso County having the second highest rate in the State.



Pandemic Influenza

Influenza is a highly contagious respiratory virus that is responsible for 36,000 deaths in the United States each year. 5-20% of the population is sick with the flu each year; it causes over 200,000 hospitalizations each year. In 2006 a total of 85 residents in El Paso County were hospitalized with Influenza.

Every year the influenza virus makes minor changes in the genetic pattern as the virus replicates. This is called Antigenic drift. An annual flu shot is needed because of this mutation each year.

An Antigenic shift is a major change in the virus that causes a new subtype of virus to develop. This virus is new to humans; therefore no humans have any immunity to the virus. This new virus has the potential to start a Pandemic or worldwide outbreak of influenza.

This Antigenic Shift is one of two ways that Pandemic Viruses develop. The other way is through wild birds. The influenza virus has the ability to infect these wild birds; they serve as reservoirs for the virus. The Avian Flu or Bird Flu is of concern now; specifically the H5N1 virus. When the virus adapts and finds the ability to be efficiently transmitted human to human, Pandemic Influenza may become an immediate threat.

This new virus also means that new vaccines must be developed to protect humans from the disease. Although the US Government and commercial vaccine producing companies have invested significant funding into developing faster methods to produce new vaccines, the current process of creating a new flu vaccine can take up to 6 months to prepare and distribute.

During the 20th century three pandemics occurred. In 1918 the “Spanish Flu” killed approximately 40 million people world wide and 675,000 in the United States. This particular flu virus was very potent and killed young healthy adults. In 1957-58, the “Asian Flu”, killed approximately 4 million people worldwide and 70,000 in the US. In 1968-69, the “Hong Kong” flu killed approximately 4 million people worldwide and 34,000 in the US.

The scientific community and the worldwide public health community are concerned about the potential for a pandemic to arise from the H5N1 virus. It is inevitable that a pandemic will occur, but it is not known when it will occur.

In El Paso County these numbers could range into the hundreds of thousands seeking health care. Despite the fact that the County has a fairly robust hospital system such a pandemic would quickly overwhelm the medical care capabilities of the County.

The economic impact of Pandemic influenza is dependent on several factors, they are: the attack and fatality rates of the disease; the duration of the pandemic; the behavior and preparedness of households and businesses; the capacity and preparedness of health care systems. Although the County has conducted extensive planning in preparation for such an event, the ability of residents to withstand such an event is still an unknown due to the psychological effect of such an outbreak. With many residents unwilling to go to work for fear of infection, there is a high concern that critical services may be severely limited due to a limited workforce. A planning figure being used is that 40% of workers will be absent due to either having the flu, or caring for a family member.

There are several assumptions that accompany the pandemic scenario.

- Localities must be prepared to rely on their own resources to respond as material and supply resources will be taxed nation-wide.
- Health care workers and first responders may be at higher risk of exposure and illness than the general population and must be considered a top priority for mass prophylaxis. Residents that support critical infrastructure (e.g. power plants) and continuity of government must also be a top priority for this initial vaccination.
- The typical incubation period (interval between infection and onset of symptoms) for influenza is two days and residents can pass the virus to others even before they have any symptoms. Viral shedding and the risk of transmission will be greatest during the first two days of illness. Children usually shed the greatest amount of virus and therefore are likely to pose the greatest risk for transmission.
- In an infected community, a pandemic outbreak will last six to eight weeks. Multiple waves of illness could occur with each wave lasting 2-3 months.

The spread of a pandemic illness is medium to high based upon population centers, but also based on the high number of transient residents that travel abroad. This is especially due to the large number of military personnel that are deployed outside the US that could potentially import a disease into this area before any symptoms are evident in the person infected. The impact of a pandemic illness could be catastrophic to the county if not quickly contained once an outbreak occurred. The county has extensive plans in place that have been validated by several exercises. The plans are based on mass mobilization, immunizations, and social distancing once the threat of an outbreak is deemed a high probability. Agencies and businesses that provide critical services (i.e. power generation and water purification) have Continuity Of Operations Plans (COOP) in place that will insure essential services are maintained with only a limited number of personnel arriving at work. Many commercial firms have plans in place for ensuring their businesses remain in operation with personnel working from home or other locations.

LANDSLIDES/ROCKSLIDES

Landslides, including rock fall and other debris flow, as a natural hazard exist in almost every state in the United States, and are a serious geologic hazard. Landslides are generally defined

as the movement of a mass of land down a slope. The land can be composed of rock, earth and artificial fill or any of the above combinations. They sometimes present a threat to human life, but most often result in a disruption of everyday services, including emergency response capabilities. Landslides and rockslides can and do block transportation routes, dam creeks and drainages and contaminate water supplies. When these hazards affect transportation routes they are frequently expensive to clean-up and can have significant economic impact to El Paso County. The area of Manitou Springs is subject to rockfall and debris flow/flash flooding. Weak, shale zones of the Fountain Formation erode during high runoff events and undercut the more durable sandstone ledges, creating rockfall and rock debris slide situations. This is precisely what happened in June 2007. A rockslide shut down part of Highway 24 in Manitou Springs.

FEMA describes debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, as common types of fast-moving landslides. These flows most frequently occur during or after periods of intense rainfall or rapid snowmelt. They typically start on steep hillsides as shallow flows that liquefy and accelerate to speeds of about 10 miles per hour, but that can exceed 35 miles per hour in more extreme cases. Debris flows have a consistency ranging from watery mud to thick, rocky mud that can carry large items such as boulders, trees and cars and can damage road surfaces. Flows from many different sources can combine in channels, and increase in destructive power. These flows continue and grow in volume with the addition of water, sand, mud, boulders, trees and other materials. When the flows reach flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc and cause significant destruction in developed areas.

During the past 25 years, development has occurred in many hill slope areas that are underlain by landslide deposits and other potentially unstable materials. The edges of hilltops have been loaded with fill, hillsides and foot slopes have been excavated, and pervasive lawn irrigation has raised subsurface water levels. In short, these marginally stable hill slope areas have become less stable because of human development. This has made the marginally stable areas more sensitive to climatic events such as heavy snowfall seasons, prolonged and heavy “monsoon” precipitation events, or large “cloudburst”-type thunderstorms. Numerous landslides occurred in Colorado Springs during the spring of 1995 following a winter of very heavy snowfall that saturated the ground during spring runoff. In April of 1999, a three-day precipitation event in the vicinity resulted in up to 14.5 inches of rainfall of both monsoonal and downpour events. These events resulted in both new landslides and reactivation of older, “dormant” slides (CGS, 1999). These events of the mid to late 1990s resulted in increasing numbers of homes being destroyed or damaged by landslides following major precipitation episodes. In response to this situation, the city of Colorado Springs passed a Geologic Hazards Ordinance in 1996. A further development resulted from the extended 1999-rainfall event when damage from floods and landslides in southeast Colorado led to a Federal Disaster Declaration that included El Paso County. As a result of this the 1999 disaster 28 homes were acquired (through the State’s “unmet needs” fund) and demolished with these areas designated as open space.

Wildfires sometimes lead to destructive debris-flow activity. In July 1994, the notorious wildfire on Storm King Mountain, west of Glenwood Springs, Colorado, stripped the slopes of vegetation and killed 14 firefighters. Heavy rains on the mountain during the following September resulted in numerous debris flows, one of which blocked Interstate 70 and threatened to dam the Colorado River.

Cleaning up drinking water reservoirs after these intense fires can cost millions. In the four years following the 2002 Hayman fire, the Denver Water Board spent over $7.8 million to

remove debris, replace culverts, build sediment dams, stabilize slopes and improve water quality. In addition, subsequent rainfalls and snowmelt can lead to flooding and landslides. The South Canyon Fire of 1994 burned 2,000 acres. Two months later, in response to a torrential downpour, a wall of mud, rocks and burned trees came crashing down onto Interstate I-70 in four places. Throughout the night and early morning, debris continued to flow, inundating a 3-mile section of the Interstate under tons of rocks and mud.

Rockfalls, sinkholes, subsidence, swelling or expansive soils and debris flows are geologic hazards related to landslides.

In 2002, an update to Colorado's Landslide plan was completed, and it identified several areas of vulnerability in both El Paso County. Colorado's plan compiled these areas into different priorities described in three distinct categories or tiers based upon the criticality of the threat. The three categories are further described as:

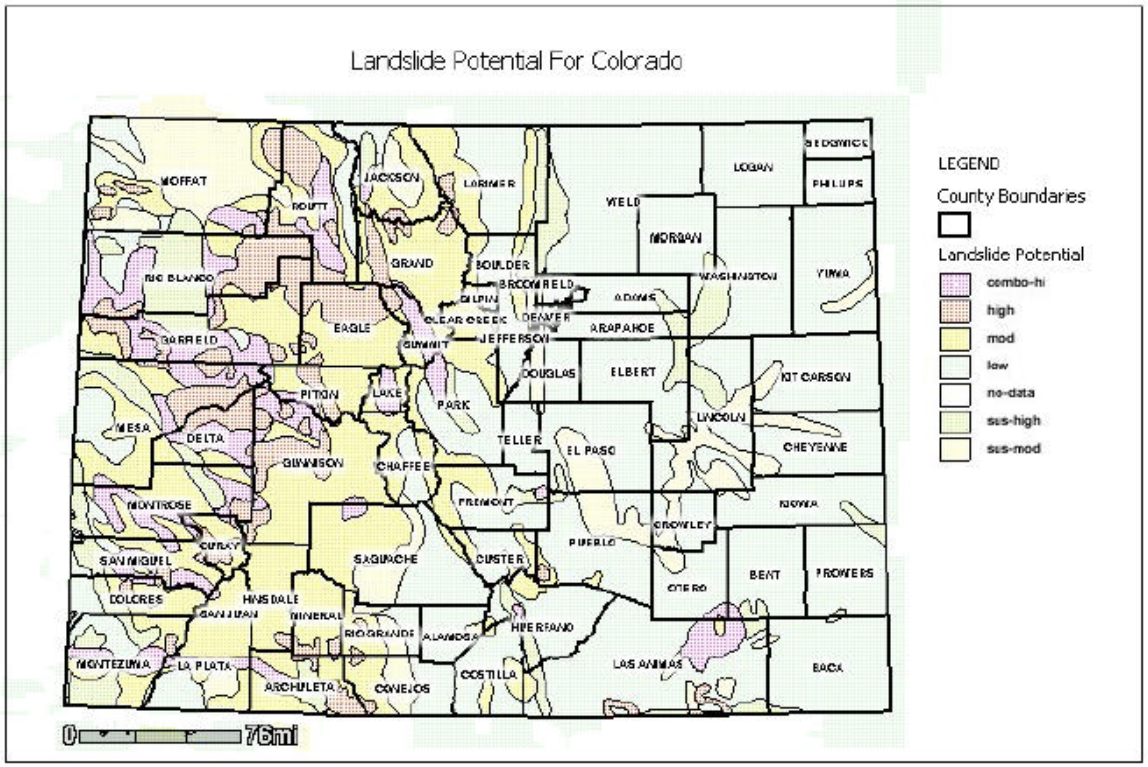
- Tier One listings are serious cases needing immediate or ongoing action or attention because of the severity of potential impacts.
- Tier Two listings are very significant but less severe; or where adequate information and/or some mitigation actions have taken place; or where current development pressures are less extreme.
- Tier Three listings are similar to Tier Two but with less severe consequences or primarily local impact.

El Paso County faces its share of landslide-related problems, especially in the western part of the county. Overall most of the county is rated a "medium" level landslide hazard area according to the state map and, despite conscientious land use planning, concerns still exist. Examples of Historical problems, some of which continue to this day, are set forth below:

Historical Incident: Fraser Canyon (AMTRAK) landslide area

The Fraser Canyon corridor was for years a high risk area for landslides, and on April 16, 1985 that area experienced a significant slide that undercut the embankment and railroad tracks. Because of the ensuing damage, a 14-car Amtrak passenger train was derailed and two locomotives and five passenger cars were thrown into the resulting breach. There were no fatalities, but 26 people were injured and damage was estimated at $3.4 million. The landslide was extensively investigated and repairs were made by the railroad immediately following the incident. An alarm fence was installed along all potential landslide areas of the railroad in Fraser Canyon.

This incident provided a vivid illustration of the serious potential consequences of even a small, but strategically located slope failure (the volume of the April, 1985 slide was estimated to be about 4,000 cubic yards, small by many standards of such activity). Due to the property losses and the potential for multiple fatalities, this landslide area was aggressively mitigated immediately after the incident. The Fraser Canyon site was selected for a Priority List maintained by the Colorado Geological Survey to exemplify the vulnerability of major rail transportation corridors that are constrained to the narrow floors of Colorado's many hazardous canyons. In these areas, the consequences of landslides, rock fall, or snow avalanches are so severe that extreme measures of mitigation and surveillance are a necessity. This is especially sobering in the year 2006, as Colorado faces the prospect of high level radioactive waste being transported across the state by both rail and highway.



Based on geological conditions within the County the greatest threat to residents for landslides and mudslides is obviously those mountain communities that are located on the west side of the County. These small communities include Green Mountain Falls, Chipita Park, Cascade, and Manitou Springs. Based on geology in the area the probability of continued mudslides and landslides is moderate to low based on the type soil in the area. Should a large wildland fire occur in these areas the probability of occurrence goes up exponentially. The impact of a rockslide or mudslide varies based on location of the event with a higher impact going to events that impact residents, Highway 24, and watershed reservoirs.

EXTREME ACTS OF VIOLENCE IN SCHOOLS

Difficult to predict and hard to mitigate in advance, extreme or random acts of violence can severely impact a community and leave long-lasting effects. One national example was the havoc wreaked for weeks by the Washington, DC snipers in 2002. During a period in the fall of 2002, Lee Malvo, a 17 year old, and John Muhammad, roamed the metropolitan Washington, DC area as snipers and randomly killed 10 people and wounded several others. The pair literally terrorized the region, while many in the press and public arena, as well as the local citizenry still suffering from the acute shocks of the 9/11 attacks, speculated that the snipers were part of a scheme carefully planned and executed by foreign terrorists.

Another recent act of extreme violence in schools was the unfortunate active shooter incident at Virginia Technical University on April 16, 2007 where a mentally ill student was responsible for the killing of 32 and the wounding of another 25 students. The horrible incident was preceded by the slaying of 3 people and the wounding of 7 in a Pennsylvania Amish school on October 2, 2006. Carl Roberts entered the one-room Amish school and without warning or provocation killed two kids and a teacher and wounded 7 before the incident was terminated. These incidents raised the concerns of law enforcement agencies nationwide as to the tactics, techniques and procedures that are utilized in such incidents, and raised the concern level nationwide by parents on the safety of their children in school.

Colorado has had its unfortunate share of these extreme acts of violence beginning with the Columbine High School incident on April 20th, 1999 in which Eric Harris and Dylan Klebold killed 12 students and wounded 24 others during the Columbine High School tragedy. This horrible incident was followed by the Platte Canyon High School shooting on September 27, 2006 in which Duane Morrison took 6 female students hostage eventually killing one before the incident was terminated.

Locally El Paso County has recently endured an incident of this nature although not at a school. The incident took place at the New Life Church which has the capacity to hold over 8,500 people for church services. This capacity does not include the remaining building that can hold as many as 4,000 additional people. The shooter was stopped by New Life Church security before he was able to cause a large number of deaths. He did shoot and kill two teenage girls that were sisters, but based on his weapons and ammunition could have killed hundreds. Other tragic incidents are that of a Harrison High School pipe bomb that did not explode and e-mail threats of killing in a junior high school. During the afternoon of 2 November, a high school teen killed several teens and wounded two severely after chasing the teens by car for over 30 minutes. The killer committed suicide when police arrived. Although this incident did not take place in a school the impetus of the incident occurred at school where a teenage love affair had begun but had subsequently gone "sour."

Acts of violence in our schools do not seem to be based on population centers, ethnic concentrations, or any other factor that the Planning Team could identify. This is based on the fact that Columbine, Virginia Tech, and New Life Church are located in highly populated areas but Platte Canyon and the Amish School House are both located in fairly remote areas with low population densities. Considering that two of the most deadly school incidents have been located in Colorado tends to raise the concern level of resident probably more than in many areas in the US. Since there seems to be no trends or factors that could be identified the Planning Team has rated all schools in the county at the same level of concern for these acts of violence with the probability of occurrence increasing as the population increases and the news media highlights these types of incidents.

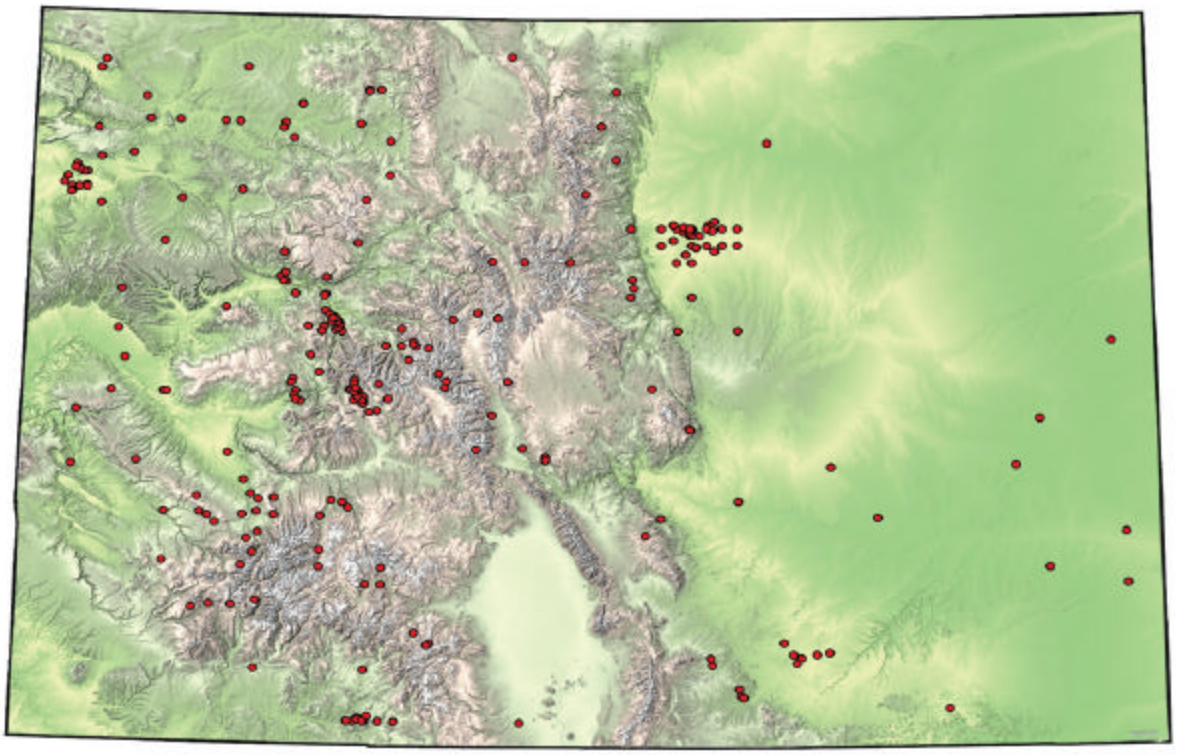
Because of incidents nation-wide, the tragic incidents in Colorado, coupled with the less tragic incidents in this County it is understandable that Extreme Acts of Violence in Schools rated so high in the public survey. The general consensus of those that were surveyed was that it was not a matter of "if" but "when" an act of violence occurs in one of our schools. Based on the increase trend of violence in schools both nation-wide as well as in Colorado, school and law enforcement personnel are taking active measures to prevent such acts, and should prevention fail quickly eliminate the threat. Examples of such measures are school districts funding security managers and the execution of a large scale active shooter exercise in 2008 at the University of Colorado at Colorado Springs (UCCS).

The impact of an active shooter in the County has already been felt in more ways than just the unfortunate killing of people. This additional impact can best be described as extensive funding that has been diverted from other areas to fund for school security systems, security managers, and diversion of law enforcement officers to be full time School Resource Officers. Historically extreme acts of violence have involved a small number of people and therefore the impact is felt both physically and emotionally by a relatively small number of people. There is potential for these acts of violence to involve significantly more people if the violence were to take on the form of a Toxic Industrial Chemical (TIC) bomb or intentional release, or of an Improvised Explosive Devise that would have similar effects to that of the Oklahoma bombing event.

EARTHQUAKE

Earthquakes are a result of vibrations when large blocks of Earth's crust move with respect to one another. The break between the blocks is a fault. When strong earthquakes (above 6.5) occur, they commonly rupture the surface. Therefore, when geologists see that a particular fault has broken the surface in the recent past, we can be fairly certain that it was the result of a strong earthquake. Because earthquakes are a result of movements in the faults, and because the same faults tend to move repeatedly, it is important to identify and study faults in Colorado that have moved in the recent geologic past. The study of past earthquakes assists geologists in understanding the potential for future events.

In general, in Colorado as well as El Paso County, is not considered to be at high risk from significant earthquake damage. More than 500 earthquake tremors of magnitude 2.5 or higher have been recorded in Colorado since 1867. More earthquakes of magnitude 2.5 to 3 probably occurred since that time, but went unreported because of the sparse distribution of population and limited instrumental coverage in much of the state. For comparison, more than 20,500 similar-sized events have been recorded in California during the same time period. The largest known earthquake in Colorado occurred on November 7, 1882 and had an estimated magnitude of 6.6. The location of this earthquake was in the northern Front Range west of Fort Collins. The most recent series of earthquakes in Colorado occurred in the vicinity of Segundo and Valdez Colorado which is approximately 12 miles west of Trinidad, Colorado. In August and September of 2001, a swarm of earthquakes (estimated at 30) struck under the towns of Segundo and Valdez with two of the quakes reaching 4.0 and 4.6. The 4.6 was felt over 1,600 miles and caused minor damage in the two towns. Earthquakes appeared previously in this area in 1966 and 1973.



Earthquakes in Colorado, 1867-1996

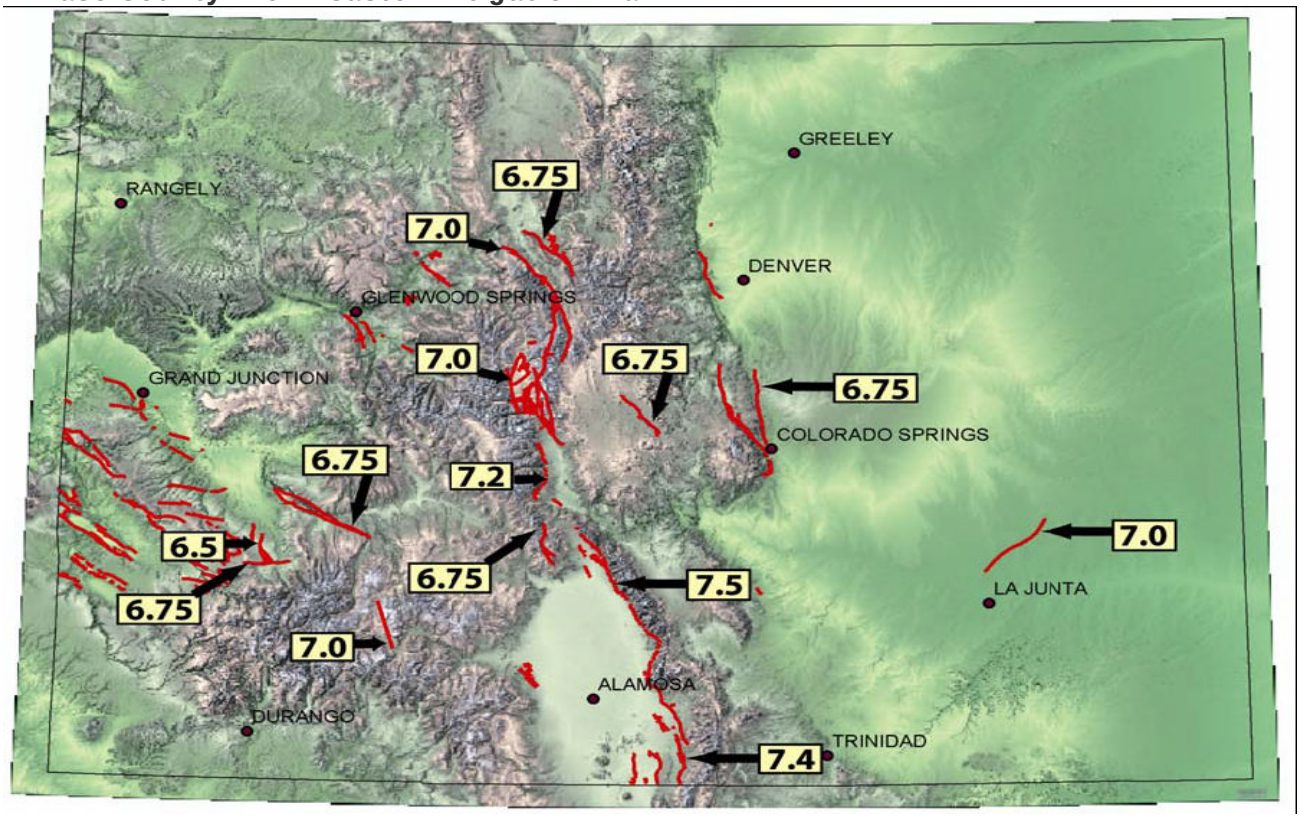
It is believed that this swarm of earthquakes may have been human caused due to a local project in the area that involved the injection of vast amounts of salt water 2 miles deep into the earth's crust. Similar earthquakes have occurred in the vicinity of the Rocky Mountain Arsenal, Rangely Oil Fields, and Paradox Valley. These three locations were the home of projects that involved the injection of vast amounts of water into the earth's crust.

The most economically damaging earthquake in Colorado's history occurred on August 9, 1967 in the northeast Denver metropolitan area. This 5.3 magnitude earthquake caused more than a million dollars in damages and was followed three months later by an earthquake of magnitude 5.2. Although these events cannot be classified as major earthquakes, they should not be discounted as insignificant. They occurred within Colorado's Front Range Urban Corridor, an area where nearly 75% of Colorado residents and many critical facilities are located. Since March 1971, well after the initial flurry of seismic activity, 15 earthquakes of approximate magnitude 2.5 or more have occurred in the vicinity of the northern Denver suburbs. At least two published articles propose that a magnitude 6.0 earthquake is possible on the Derby fault located near Denver. The Derby Fault lays thousands of feet below the earth's surface but has not been recognized at ground level. Such an earthquake would cause more than $10 billion damage.

The state is ranked 30th in the nation in terms of Annualized Earthquake Losses by FEMA. However, a growing body of data suggests that Colorado may be at greater risk than previously recognized. Colorado has the second largest heat flow anomaly in the North American continent (93 hot springs and hundreds of small ones), fifty-eight peaks over 14,000 feet and extensive Neogene (Period that was 23M years ago) deformation indicative of active fault movement. Further, it would be somewhat naïve to suggest that a state with 58 peaks over 14,000 feet, the highest average elevation in the country (6800 feet), does not have active mountain building going on. It is believed that these mountains were uplifted by thousands of feet of movement much of it in the past 5 million years. Faulting, volcanism, high heat flow, earthquakes, and rugged, challenging mountains indicate that this activity continues today.

The catalog of Quaternary faults in Colorado has steadily increased from zero in 1960 to 90 in 1998 with many areas unexamined. Quaternary faults are faults that occurred in the Quaternary Period (Period that was 1.8M years ago) and are considered new faults. New faults are considered to be active as opposed to older faults that have been dormant for hundreds of thousands of years. There are 92 faults and 6 folds in Colorado. There are currently two Quaternary faults in El Paso County. It is estimated that the potential seismic activity of these faults would be in the range of 6.75 on the Richter Scale.

The catalog of Quaternary faults in Colorado has steadily increased from zero in 1960 to close to ninety in1998 with many areas of the state unexamined. The strong earthquake in 1882 has been definitively located in the northern Front Range (vic Estes Park). Studies of Quaternary faults in Colorado have resulted in 13 faults being assigned a "maximum credible earthquake" that has potential from 6.25 to 7.5 on the Richter Scale. Two of the 13 are located in El Paso County in highly populated areas.



Quaternary Fault Lines and Estimated Seismic Activity

Until the summer of 2002, Colorado had only two seismographs as part of the National Earthquake Information Center (NEIC) network. Because they were so close together and one of them was in a noisy location, the state in effect had only one station. Since that time two more sensors were added that allow for more accurate triangulation of earthquakes. The triangulation method is what is used to determine the epicenter of an earthquake. Prior to this time the epicenters were generally located with an error rate of up to 15 miles.

It is not possible to accurately estimate the timing or location of future dangerous earthquakes in Colorado. The lack of an adequate network of seismometers in Colorado makes it difficult to detect and locate earthquakes. It is reasonable to expect future earthquakes, as large as magnitude 6.75, to match the largest recorded event. Calculations based on the Historical Earthquake Record and geological evidence of recent fault activity suggest that an earthquake of magnitude 6 or greater may be expected somewhere in Colorado every several centuries.

When one views the entire record of what is known in El Paso County (and Colorado in general) about faulting, tectonics, and earthquakes, one is led to the conclusion that caution must be used in blindly following the current hazard categories. One of the most active faults with one of the best-known records of earthquake recurrence in Colorado is located northeast of La Junta (only 50 miles south of the El Paso County border). Based on the historical earthquake record and geologic studies in Colorado, an event of magnitude of 6 ½ to 7 ¼ could occur somewhere in the state. Scientists are unable to accurately predict when the next major earthquake will occur only that one will occur. The major factor preventing the precise identification of the time or location of the next damaging earthquake is the limited knowledge of potentially active faults. El Paso County would be considered a low to moderate threat but a high consequence area. This is defined as low to moderate risk for an earthquake to occur but if one occurred the area is a high consequence area for injury, death, property damage.

In cooperation with FEMA's Region VIII, the Colorado Geological Survey (CGS) conducted two evaluations to estimate potential losses due to an earthquake. The results indicate that a repeat of the 1882, 6.6 earthquake north of Estes Park would cause $240 million in losses. An evaluation of the Trinidad earthquake swarm would result in $15 million in losses. The population of Trinidad and general surrounding area is approximately 10,000 people while the population of El Paso County western area (vic of the two active faults) is estimated at 500,000. Using the Trinidad data as a basis one would estimate the losses in El Paso County would be approximately $750 million.

Based on the known fault areas El Paso County is overall a medium risk for an earthquake but a high consequence for damage and loss of life. Considering that El Paso County contains two active faults, high elevation in the west including Pikes Peak, and several hot springs the possibility of a future earthquake is probable. Additionally, based on these factors the earthquake will most likely have an epicenter in a highly populated area. The impact to the area would vary depending on damage to critical infrastructure, businesses, and natural resources. One of the most devastating 2nd order effects that could occur would be the breach of dams located in the county that would inundate large residential areas in a short period of time. This type of event has a low probability as, in general, the geology of El Paso County is favorable for construction of dams with inherent characteristics to withstand the effects of earthquake shaking. The foothills and mountainous areas have shallow granitic bedrock and the plains have relatively shallow sedimentary bedrock and clayey residual soils. The soils available for construction of the rolled earth embankment dams in El Paso County generally consist of the weathering materials for those two bedrock sources. Historical evidence from more seismically active areas indicates that virtually any well-built dam on a stable foundation will perform well during moderate earthquake shaking, about 0.2g. Further, the evidence suggests that dams constructed of clay soils on clay or rock foundations have withstood extremely strong shaking from earthquakes of greater magnitude than would be expected in the El Paso County region. Historically, dams that suffered complete failure or significant damage were constructed of saturated sandy shells (hydraulic fills) or on saturated sandy foundations; conditions that are generally not found in the dams constructed in El Paso County.

Disruption of the roads and highways would affect residents in the county but also affect states to the north and south of Colorado as well if Interstate 25 were to be impacted for any length of time. Obviously the highest concern is for those population centers that contain a large number of homes and businesses in which an earthquake could cause a large number of deaths as well as huge infrastructure damage.

Human-Caused Hazards (Terrorism)

FEMA considers "manmade" hazards (referred to in this document as "human-caused) to be technological hazards and terrorism. These are different from the natural hazards considered above because they arise from human activity. In contrast, while the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently or intentionally created by humans.

The term "technological hazards" refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage and use of hazardous materials. To distinguish from intentionally-caused or terrorist events, this definition assumes that technological emergencies are accidental and their consequences unintended. The term "terrorism" refers to *intentional*, criminal, malicious acts designed to further a political or social agenda.

Human-caused hazards reviewed for this plan run the gamut and include such concerns as potentially catastrophic Weapons of Mass Destruction event, widespread flooding caused intentionally, hazardous materials releases and prison breaks. Public and professional participants in this project did not rank terrorism events as very likely and ranked HAZMAT and human-caused flooding events as having a greater probability of occurrence. Despite terrorism's lower rating, El Paso County offers well-known, high profile events and venues, and the possibility of them being the site of a terrorist event has not been overlooked.

TERRORISM – INTERNATIONAL AND DOMESTIC

Terrorism is often categorized as "international" or "domestic", and this distinction refers *not* to where the terrorist act takes place but rather to the origin of the individuals or groups responsible. For example, the 1995 bombing of the Murray Federal Building in Oklahoma City was an act of domestic terrorism, whereas the attacks of September 2001, notwithstanding that the sites struck were within the United States were international in nature because of the origins of the perpetrators. For the purposes of consequence management, the origin of the terrorist is less important than the results of the attack on life and property; thus, the distinction between domestic and international terrorism is not as relevant for the purposes of mitigation, preparedness, response and recovery than understanding the destruction such groups can cause.

Right-wing militia groups in the United States have been thought to be in decline for years, perhaps as a result of the spotlight being placed upon them after the April, 1995 Oklahoma City bombings. The Anti-Defamation League (ADL) tracks such extremists however, and reports that they have experienced a recent growth in activity that indicates a renewed, but low key attempt to revive the anti-government movement. These new groups operate more quietly and train more intensely than their 1990s counterparts, and have post-September 11 versions of the "New World Order" conspiracy theories that motivated their predecessors.

Although the militia movement has been around for many years, it burst into greater prominence in the wake of deadly standoffs at Ruby Ridge, Idaho, in 1992 and Waco, Texas, in 1993. It garnered great publicity following the Oklahoma City bombing in 1995, although it was erroneously linked to that horrific event. At its peak, the movement had hundreds of groups and thousands of members. In its current monitoring of the militia movement, the ADL lists 30 states which have active militia groups. Colorado is not one of those states considered as having an active group.

While the list of confirmed terrorism-related events in Colorado is not long, it is perhaps highlighted by the notorious act of domestic terrorism committed by the eco-terrorist group, the Earth Liberation Front (ELF) at the Vail Ski Resort in October, 1998. Three buildings and portions of four chair lifts were destroyed by fire and damages with a value of approximately $12 million were incurred. In a letter sent to news-media outlets, ELF claimed responsibility for the arson "...to stop the destruction of natural habitat and the exploitation of the environment." It stated the Vail expansion plans would "...ruin the last, best lynx habitat in the state. Putting profits ahead of Colorado's wildlife will not be tolerated. This action is just a warning. We will be back if this greedy corporation continues to trespass into wild and unroaded areas."

Vail, 1998 Eco-terrorism and its aftermath

El Paso County is home to 5 military installations including the home of US Northern Command and the US Air Force Academy. The county is also home to the US Olympic Training Center. Military installations are considered "hard" targets or targets that are well protected and they are difficult to attack versus "soft" targets that are not well protected and easily attacked. Although the military is a potential target, the probability of an attack against a military installation is considered low due to the difficulty in gaining access to cause serious harm. Although secured, the US Olympic Center is considered a soft target with a more probable chance of being a target than the military. Most experts believe that a follow-on attack to 9/11 is overdue in the U.S., and given the ease with which an attack can be conducted, another attack is certainly feasible. Many experts believe that the next attack on the US will most likely come in the form of an Improvised Explosive Device or other type bomb or an airplane crash and not an attack of 9/11 magnitude. Therefore the greatest threat for residents is within the population centers especially those high profile businesses that could result in a high economic loss to the area. The probability of any future acts of terrorism is difficult to estimate but based on the military installations and the rate of growth of the Colorado Springs area the probability is most likely increasing.

AIRPLANE CRASHES

Periodic plane crashes are an unfortunate fact of life in mountain regions. Unpredictable, sometimes violent weather and rugged terrain often create a hazard for air travelers, especially those traveling in smaller craft. El Paso County's recent history reflects a number of aviation incidents, some fatal, and many of which are concentrated around the county's airport.

El Paso County, like many mountainous areas, demands the best of pilots. El Paso County has three active airports of which two are for small, private planes and one is a commercial airport. Commercial accidents are rare with the most notable occurring in March 1991 in which Flight 585 crashed while making its final approach to the Colorado Springs Airport killing 25 people on board. This loss of life was kept to only those on the aircraft due to simple luck, as the plane came down in a park, immediately adjacent to an apartment complex and sub-division. Since that time, the area over which aircraft make their final approach and initial take off is becoming more and more highly populated, especially to the north of the airport. Any aircraft taking off to the north or landing from the north has the potential to cause serious harm and mass casualties on the ground. Although the south side of the airport contains fewer residents this area is also being rapidly developed over the next 5-10 years.

Based on historical numbers, the greatest danger for aviation in El Paso County is from small airplanes including those that are privately owned, as well as those that are contracted by the US Air Force Academy and Peterson Air Force Base as part of their Aero Clubs. Weather patterns in the Front Range can change rapidly and in many cases can exceed the competency of many pilots. Since 2002 there have been 19 crashes of small aircraft with only one of these crashes resulting in a fatality.

Private Aircraft Crash December 2006, NonFatal

Aircraft crashes have and will continue to be a danger to residents in the County. The great danger would be a commercial aircraft crash in a highly populated area. Since aircraft appear to be a terrorist weapon of choice, an intentional aircraft crash into a populated area cannot be disregarded. Considering the increasing number of flights into and out of the Colorado Springs Airport, the probability of an aircraft crashing either accidentally or intentionally is continually increasing and the impact is increasing as well due to number of residents and businesses being built in the departure and approach path for flights.

DAM BREACH BY INTENTIONAL OR INADVERTENT HUMAN INVOLVEMENT

Dams have proven to be attractive wartime targets, and they are considered by some to be potential targets for terrorists. The terrorist's desire may be hard to fulfill in this case though, because the deliberate destruction of a dam is no simple task. Yet the possibility exists that such an act could occur, and it should not be discounted by law enforcement, the community or the dam owner. The county has 18 Class I and 15 Class II dams located within its borders and has never experienced a dam breach. The El Paso County OEM currently has all the Class I dam emergency preparedness plans on hand and obtains an annual update to verify emergency points of contact and updated inundation maps. As the population in the county increases, so does the number of residents located in the various dam's inundation areas.

The range of human behavior encompasses simple mistakes, operational mismanagement or unnecessary oversights and these can be potential causes of dam failure. Such risks can act in combination with other hazards to aggravate the possibility of failure and should be included in the analysis of risk to a dam. For instance, various pieces of mechanical equipment and rock riprap are especially susceptible to vandalism and damage. Wildland fire, in particular, can severely degrade the vegetation on embankments, and worn areas lead to erosion and more

serious problems. Some community experts have voiced concerns about the consequences of a major landslide into a water reservoir, and this may be one of the most probable threats to consider for future mitigation activities.

Another activity that poses a risk is the tendency for people to create communities near or below dams. The construction of residences, buildings and other structures in the inundation zone creates new risks, and will most likely create increased risks in the future. As an example, the failure of North and South Catamount Dams, as well as the Crystal Creek Dam, would devastate Green Mountain Falls, Chipita Park, and Cascade as well as create severe flooding down the Fountain Creek Watershed.

The greatest threat to residents is to those located in the inundation areas of each dam. The threat is especially high to the communities of Green Mountain Falls, Chipta Park, Cascade and Manitou Springs that might have little to no notice of a breech to the dam and therefore no time to evacuate. Notwithstanding these potential perils, the hazard of this type of human-caused high-flow event is considered low for now and in the near future by the Planning Team. This is due to the inspection standards of the State and the extreme difficulty for anyone to be able to cause an intentional dam breech.

MILITARY ACCIDENT

Military accidents of all kinds were another hazard considered by the planning team, but little evidence is available to indicate these kinds of incidents should receive priority treatment.

One incident that occurred in the nearby area and received nationwide attention happened in April, 1997 in El Paso County, when an A10 Warthog, flown by Captain Craig Button and carrying four 500-pound bombs, veered off course from a training mission in Arizona and was tracked by radar and visual sightings to the vicinity of New York Mountain.

Residents near the flight path and crash site reported hearing loud explosions and seeing heavy smoke. The debris of Captain Button's plane was subsequently found on the side of a 12,500-foot peak about 15 miles southwest of Vail. At the time, rumors were rampant that Captain Button's plane may have been hijacked by terrorists or, perhaps, was willingly turned over to radicals. The onboard presence of bombs and the suspicious fact that the plane had veered as much as 800 miles off-course in southwestern Colorado only added to the concerns. After a lengthy investigation the crash was officially ruled a suicide.

Events such as these are spectacular and command headlines for a time, but are rare in the planning area; therefore, this hazard was ranked low on the list of area hazards. This ranking is expected to remain the same even though Fort Carson is expected to be increased by over 20,000 personnel in 2008 – 2010.

The impact of a military accident varies depending on the type of incident but in most cases the impact is moderate to low. The worse case scenario would be that of a helicopter crashing or an errant howitzer round exploding into a populated area. Considering the location and direction of Fort Carson's live fire ranges the later is an almost an improbability.

AVALANCHE

Although infrequent, avalanches do occur periodically in this region. In January 2007, Manitou Springs experienced an avalanche. The avalanche spilled snow 15 feet deep onto a local highway leading to the top of Pikes Peak Mountain. The Highway was closed for the winter months therefore there were no injuries or property damages caused by this avalanche. Other

than this incident there has been no record of avalanches occurring in El Paso County in the last 10 years. The probability of an avalanche occurring in the future is low and was considered as such by the planning committee. The greatest impact from an avalanche is to those mountain communities of Green Mountain Falls, Chipita Park, and Cascade as well as Highway 24, but avalanches are also a danger to hikers, mountain bike riders, and others involved in outdoor sports in these areas.

DROUGHT

Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for a certain sector. Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought.

Vulnerability to drought is determined by a wide range of factors, both physical and social, such as demographic trends and geographic characteristics. People and activities will be affected in different ways by different hazards. The sequence of impacts associated with drought further emphasizes their differences. When drought begins, the agricultural sector is usually the first to be affected because of its heavy dependence on stored soil water. Soil water can be rapidly depleted during extended dry periods. If precipitation deficiencies continue, then people dependent on other sources of water will begin to feel the effects of the shortage. Those who rely on surface water (i.e., reservoirs and lakes) and subsurface water (i.e., ground water), for example, are usually the last to be affected. A short-term drought that persists for 3 to 6 months may have little impact on these sectors, depending on the characteristics of the hydrologic system and water use requirements.

When precipitation returns to normal and meteorological drought conditions have abated, the sequence is repeated for the recovery of surface and subsurface water supplies. Soil water reserves are replenished first, followed by streamflow, reservoirs and lakes, and ground water. Drought impacts may diminish rapidly in the agricultural sector because of its reliance on soil water, but linger for months or even years in other sectors dependent on stored surface or subsurface supplies. Ground water users, often the last to be affected by drought during its onset, may be last to experience a return to normal water levels. The length of the recovery period is a function of the intensity of the drought, its duration, and the quantity of precipitation received as the episode terminates.

Drought conditions in El Paso County have been recorded since 1890. During this recorded history droughts have impacted the county on numerous occasions. The most recent drought began in El Paso County in 2000 and lasted until 2005. The most severe year was 2002 in which the county endured its worse drought in recorded history since 1977. Although 2003 provided slightly more precipitation it was still the 6th driest season in recorded history. Of the last three declared disasters in El Paso County two were due to drought.

El Paso County is considered a semi-arid region with an average rainfall of 14.49 inches and 35 inches of snow each year. Snowmelt, the main source of water for the Front Range, has fluctuated year to year. Snowmelt water is "fed" into the county via the Fountain Creek Watershed. Despite normally abundant mountain snowfall that feeds this watershed, El Paso County's semi-arid climate makes water the county's most precious resource. This watershed provides 15% of the drinking water for those residents that are serviced by Colorado Springs Utilities (CSU) and supports over 100 ranches in the county. 85% of CSU's water is pumped from west of the Continental Divide, and after use, this water is treated and discharged into the Fountain Creek. The residents not supported by CSU obtain their water via wells or water districts that draw water from the Denver Basin, Pierre Shale, or alluvial aquifers.

The Denver Basin consists of four aquifers that include the Dawson, Denver, Arapahoe, and Laramie-Fox Hill. The four aquifers that make up the Denver Basin are layered one on top of the other. Because of these confining layers and the limited connection between the four aquifers and surface water, the ground water in the aquifers are not considered renewable. The water in these aquifers was deposited thousands of years ago and is considered a finite resource. A US Geological Survey estimates that 467 million acre-foot of water is stored in the Denver Basin aquifers, but only 259 million acre-feet of this water are recoverable. Because the water is not renewable once it is "mined" it is gone forever. With as many as 300,000 to 400,000 people relying on the Denver Basin along the Front Range the water levels are dropping 20-30 feet per year.

The southern portion of the county utilizes ground water found in the Pierre Shale and Dakota/Cheyenne aquifers. The aquifers are low yielding but are renewable. In the western side of the county the pre-Cambrian granitic rocks is the source for groundwater but it is also low yielding but is recharged on an annual basis. In the eastern part of the county the Pierre Shale aquifer is the most utilized. There are currently 22,000 wells in the county with 19,000 accessing the Denver Basin and 3,000 accessing the Pierre Shale aquifer. The Pierre Shale aquifer appears to be in a declining state causing ranchers and those living in the east to consider digging deeper wells, developing community wells and trucking water, or developing a distribution system into the area.

Throughout the county there are several major streams which flow over the Denver Basin, Dakota/Cheyenne, and pre-Cambrian aquifers. Associated with these streams are alluvial deposits that carry significant volumes of water which are used by county water providers as well as residential wells. The alluvial aquifers provide the most reliable ground water in the county as they provide over 1,000 gpm and are renewed by the Fountain, Monument, Sand, Upper Black Squirrel, and Jimmy Camp Creeks. The alluvial water is enhanced with surface storage capability that includes the Bristlecone, Pinon, Woodmoor Reservoirs, and Monument Lake. The Upper Black Squirrel Creek aquifer is currently being "mined" in that the water level is declining because it is being removed faster than it is being renewed.

Drought conditions affect residents, businesses including agriculture based businesses (cattle ranches), as well as open spaces. Drought conditions that began in 2001 have severely stressed the pine forests that are abundant in the western part of the county. This stress has resulted in a weakening of the pine trees and has made them extremely susceptible to pine beetle infestation. This infestation has killed an extremely large number of pine trees in the county which has elevated the fuel loading of the Wildland Urban Interface to over 40 tons per acre. This condition has caused extreme concern over the potential of a large wildland fire which was previously discussed in this plan. Droughts create perfect conditions for catastrophic wildland fires. During 2002 the region suffered the worst wildland fire in history which was the Hayman fire that burned over 200,000 acres. Drought conditions have caused crops to fail especially alfalfa and hay (68% of the crop in the County) which in turn caused many ranchers to sell cattle at a loss. Drought conditions have reduced the amount of water available to many

residents for various uses. During 2002 water restriction were placed on residents that reduced the watering of lawns to only one time per week. As noted earlier in this plan the most reliable source of water for the county is in the renewable alluvial aquifers but, these renewable resources are also the most prone to long term impact from droughts depending on how quickly the aquifers are replenished. Drought severely restricts the availability of snowmelt water and mountain water that become part of the Fountain Creek Watershed.

Based on possible climate changes, droughts in El Paso County are expected to increase. A 2006 State of the Rockies Report Card issued by the Colorado College predicted climate change in the next 80 years will threaten the ski industry and the urban water supply.

The county's population is over 560,000 and continues to grow each year and is estimated to grow 54% from 2000 to 2030 with the most substantial growth to take place in the areas east of Colorado Springs and in the northern parts of the county. With this increase in population also comes the corresponding increase in water consumption. The greatest growth is expected in the unincorporated areas. In fact between 2000 and 2006, the portion of building permits issued in El Paso County for construction in the unincorporated areas grew from 24 percent to 38 percent. El Paso County is expected to grow by 300,000 residents by 2030.

Based on these factors -- increasing population and increasing demand for water – the impact of a drought will only continue to increase. This impact will affect residents, businesses, and agriculture alike. In fact droughts have the potential to only increase the conflicts that arise over water rights and water use in the county. Based on climate trends and predictions it is estimated that droughts may occur more frequently. The impact can potentially be mitigated by obtaining more sources of water, better conservation methods by residents, intentional recharge of the Basin and aquifers, dual use water systems, and other type methods.

Risk Assessment

Best practices and guidance from the DMA 2000 prescribes that multi-jurisdictional planning areas, such as conducted by El Paso County, consider risk priorities and potential losses for the region as a whole. Risks related to each jurisdiction should also be assessed for vulnerabilities and loss potential specific for those jurisdictions. El Paso County conformed to this guidance by conducting the following risk assessment activities to establish risk potential and hazard impact within the planning areas:

- Public Risk Assessment Input
- Identification of Critical Infrastructure
- DHS Risk Assessment

PUBLIC RISK ASSESSMENT INPUT

Public comment was collected through e-mail based surveys to increase the potential for public participation. As part of this survey process, the Working Group also solicited input from professionals in emergency management, fire services, medical and health services, law enforcement, planning, education, airport management, government administration, community development, transportation, utilities and others in public and private sectors.

The community surveys were conducted according to this general methodology:

1) Survey population was identified as:
   a. Community residents
   b. Emergency responders
   c. Those with relevant subject matter expertise, such as those in planning, education, airport management, community development, veterinary services, utilities and the elements of the private sector

2) Survey notices were issued using:
   a. E-mail distribution to a global address book of over 650 county residents
   b. Individual invitations to groups such as fire departments, law enforcement and others

3) Survey questions were developed for general community members and those in emergency services

4) The surveys were conducted to allow ample time for response.
   a. The survey launch was May, 2007
   b. The survey concluded on August, 2007

5) Data collection and reporting
   a. No personal data was acquired through this survey. Respondent names were requested on an volunteer basis only for survey validation
   b. Survey results were compiled and analyzed by the planning team

The intent of the survey was to sample a broad set of stakeholders within the resources available. Although this survey was not conducted to scientific standards, the responses from community members were generally consistent with those from known experts and, therefore, considered valid input.

FORMAL RISK/HAZARD ASSESSMENT

During calendar year 2006 the Colorado South Central (All-Hazards) Region (consisting of OEMs from Colorado Springs, El Paso, Chaffee, Park, Lake and Teller Counties) contracted for a Strategic Plan and an Emergency Operations plan for the region. As part of the Strategic Plan a

formal risk/hazard assessment was completed along with a corresponding gap analysis to determine future training and equipping requirements. The risk assessment provided for an overall hazard assessment for the SCR. This assessment was utilized for several reasons:

1) Hazards and their consequences are not geographically limited by County borders.
2) Response capabilities are strategically procured and located in the SCR, and provide support based on mutual aid agreements. This is critical as HLS funds are provided to the All-Hazard Region and therefore response capabilities within the County and region are regional assets.

The results (top 5) of both the El Paso County public survey and the South Central Region Hazard Assessment are listed below:

El Paso County Public Survey	South Central Region All-Hazard Assessment
Hazard	**Hazard**
Wildfire	HAZMAT Transported
Severe Weather	Severe Weather
HAZMAT - Transported	Public Health (Disease) Outbreak
Extreme Violence--Schools	Wildland Fire
Disease Outbreak	Rockslide/Landslide

It is interesting to note that both the public survey and the formal risk assessment were very close in hazard ranking with four of the five hazards noted on both. In establishing an overall ranking of the hazards, the PDMP Working Group team also considered the potential for the occurrence and future impact from the prioritized hazards. Expert input indicates that probability exists that the prioritized hazards will continue to affect the planning area. And based on population growth projections and anticipated property value increases, it was determined that the future impact potential from these hazards would increase in the absence of effective mitigation actions.

HAZARD IMPACT ON CRITICAL INFRASTRUCTURE

The planning team reviewed El Paso County's critical infrastructure using the 13 critical infrastructure areas defined by the Department of Homeland Security as a guide. Impact from the prioritized hazards was ranked as *low*, *moderate* or *high* for the identified critical infrastructures within El Paso County. Findings from risk assessment activities were used to determine hazard impact on the critical infrastructure. Notwithstanding hazard impact on critical infrastructure, however, El Paso County weighted mitigation actions for hazards affecting life and safety.

Effective September 1, 2006, the Federal Government created 6 CFR 29 establishing uniform procedures to implement the Critical Infrastructure Information Act of 2002. These procedures govern the receipt, validation, handling, storage, marking and use of critical infrastructure information that enjoys protection under the Critical Infrastructure Information Act of 2002. This rule applies to all Governmental contractors, State, local, and other governmental entities that handle, use, store, or have access to critical infrastructure information.

In keeping with the rules and intent of 6 CFR 29, El Paso County monitors access to this information through the Emergency Services Division of the El Paso County Sheriff's Office. Access to this information is available on a need-to-know basis by application to the El Paso County Sheriff's Office, Emergency Services Division.

Based upon the Risk Assessment and public input El Paso County PDMP Planning Group identified the hazards that posed the high risks to residents. The PDMP Working Group determined that the following hazards justify mitigation planning and are the focus of the mitigation actions described in this PDMP:

- Wildfires
- HAZMAT – transported
- Severe Weather (snowstorms, flash floods, and tornadoes)
- Disease Outbreak
- Rockslide/Landslide

It is anticipated that future versions of the PDMP will not only refine the risk assessment for these hazards, but may encompass further analysis and planning for additional hazards not prioritized in this first plan.

Hazard Mitigation

In determining mitigation efforts the top priorities of both the public survey and the formal SCR assessment were considered. Based on public perception and recent trends in local schools Extreme Acts of Violence—Schools was added to the overall hazard list to be considered. Since the completion of the SCR hazard assessment an in depth study of wildland fire for the entire Rocky Mountain 8-State Region was completed by Colorado College. This document, entitled "Colorado College State of the Rockies Report Card 2007," placed El Paso County number 10 of all counties in the 8-state Rocky Mountain region, and #1 in the State of Colorado, for having conditions favorable for a catastrophic wildland fire. Based on this in depth study, the planning committee agreed to move wildland fire as Number One on the hazard list but the remaining hazards were left in order. The new hazards prioritization list is as follows:

- Wildland Fire
- HAZMAT – transported
- Severe Weather
- Disease Outbreak
- Landslides/Rockslides
- Extreme Acts of Violence--Schools

These hazards were prioritized, in part, by their broad impact, or potential for broad impact, on El Paso County's residents, economy, critical infrastructure and vital services. Although this plan is for the unincorporated areas of the County it is important to understand the effects of hazards to the population and economics of residents located in the municipalities. Since hazards are not confined to jurisdictional boundaries they were given a high, medium or low level of probability of occurrence as well as level of damage that each hazard posed to the population and economy of the County as a whole. This will weigh heavily in the cost-benefit analysis for projects and actions deemed necessary by the Planning Group.

Community	Wildfire	Severe Weather	HAZMAT Transported	Landslide / Rockslide	Disease Outbreak	Extreme Acts of Violence
Palmer Lake	H	H	M	L	M	M
Monument	M	H	M	L	M	M
Colorado Springs	H	M	H	L	H	H
Calhan	H	H	M	L	M	M
Green Mountain Falls	H	H	M	H	M	M
Fountain	H	M	H	L	M	M
Manitou Springs	H	M	M	H	M	M

El Paso County has adopted mitigation strategy guidance from FEMA that suggests a risk-analysis method that uses two general categories for pre-disaster mitigation:

- Actions to reduce the frequency and/or severity of hazard events
- Actions that reduce the vulnerability of community assets

Accordingly, the mitigation actions set forth in this section draw broadly on those concepts and from a collection of respected resources. For example, some of the proposed mitigation actions were suggested by survey and project participants from El Paso County. Other potential actions were found during the course of research conducted for the project and are provided for additional analysis and consideration by county officials and interested citizens.

MITIGATION GOALS AND OBJECTIVES

To serve as a blueprint for El Paso County's PDMP and to comply with FEMA guidance from the Hazard Mitigation Grant Program, El Paso County identified goals and objectives for mitigation actions.

A mitigation goal is a broad guideline that explains what is to be achieved, and it serves as the vision for mitigation actions. Objectives, on the other hand, are specific steps or measurable actions needed to achieve the goals. The PDMP Working Group considered and developed goals and objectives as part of the mitigation actions, and those goals and objectives are summarized with related proposed mitigation actions below. Goals and associated objectives and mitigation actions are listed in Appendix A of this document.

PROPOSED MITIGATION ACTIONS

El Paso County evaluated a broad set of mitigation actions for the prioritized hazards. Mitigation actions for these hazards were categorized into six groups:

- Prevention
- Life Safety
- Natural resource protection
- Property protection
- Emergency services
- Public education and awareness

Potential mitigation actions were determined though interviews with public and private sector experts summarized in the table below supported by input from community residents and independent research by the Working Group. The table below includes a partial but representative list of sources consulted for potential mitigation actions relevant to the prioritized hazards.

Potential Mitigation Action Sources for Various Hazards	
Prioritized Hazard	**Interviews and Document Reviews Conducted for Potential Mitigation Actions**
Wildfire	• Chief, Wildland Fire Team for El Paso County • Wildfire Mitigation Specialist, City of Colorado Springs • El Paso County District Forester, State Forest Service • El Paso County wildfire regulations • Wildfire Plan, El Paso County

	• Wildland Fire Mitigation Plan for the City of Colorado Springs
HAZMAT	• Chief, El Paso County HAZMAT Team • Director, El Paso County Environmental Office • LEPC, El Paso County • Federal Regulations (29 CFR, etc) • Lessons Learned from HAZMAT Call-Outs
Severe Weather	• National Oceanic and Atmospheric Administration (NOAA) • Director, Road and Bridge, El Paso County • Director, El Paso County Transportation/Public Works • U.S. Weather Service • Floodplain Manager for El Paso County
Disease Outbreak	• El Paso County Department of Health • State Pandemic Flu Plan • SCR Pandemic Flu Plan
Landslides/Rockslides	• Director, El Paso County Transportation/Public Works • Colorado Geological Survey • El Paso County Supervisor, Colorado Dept. of Transportation
School Violence	• El Paso County Sheriff • School District 49 Safety Committee • School District 11 • School District 20 • New Life Church • Lessons Learned from Columbine High School, Platte Canyon High School, Virginia Tech, and New Life Church Incidents

Once collected, mitigation actions were evaluated using the STAPLEE methodology, which is a standard methodology, approved by FEMA, that seeks to objectively evaluate mitigation options and ensure those selected are consistent with and complementary to other community goals and objectives. The results of the STAPLEE evaluation process produced prioritized mitigation actions for implementation within the planning area. A summary of STAPLEE evaluation criteria is shown in the following table.

STAPLEE Mitigation Action Evaluation Criteria Overview	
S - Social	Actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause unreasonable impact to lower income people, and if they are compatible with the community's social and cultural values.
T - Technical	Actions are technically most effective if the provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Proposed actions can have the necessary staffing and funding.
P - Political	Public support for the action is evident and all stakeholders have had an adequate opportunity to participate in the process.
L - Legal	The jurisdiction or agency implementing the action has the legal authority to do so.
E - Economic	An evaluation of whether or not the proposed action is cost-effective, as determined by a cost-benefit review and able to be funded.

E - Environmental	Verification that the proposed actions do not have an adverse environmental effect, comply with existing environmental laws and are consistent with the jurisdiction's environmental goals.

MITIGATION ACTION IMPLEMENTATION STRATEGY

The mitigation actions identified in Appendix A will be implemented under guidance from the PDMP Working Group for El Paso County. This Working Group has been formed under direction of the emergency program manager, and will include public participants from the planning area as well as others jurisdictional agencies such as finance, facilities, parks and recreation, fire, law enforcement, planning and others.

Budget availability for hazard mitigation is minimal within El Paso County. Changes to federal law, however, encourage a more proactive strategy, and El Paso County's PDMP. El Paso County's mitigation action implementation plans will be formed by the PDMP Working Group. Initial activities for this Working Group will be to 1) prioritize each action 2) assess each proposed mitigation action including development of a cost-benefit analysis 3) complete an implementation plan including identifying a lead agency, funding sources, and appropriate timelines for completion.

Plan Maintenance and Adoption

PLAN MAINTENANCE

The Plan is intended to be a 'living' document that informs stakeholders about hazard mitigation projects and plans undertaken by El Paso County. El Paso County understands the need to regularly review and update the PDMP based on evolving hazards, new mitigation techniques and changes in land use and critical infrastructure within the planning area. This review and update will occur on an annual basis and with oversight provided by the PDMP Working Group. The next PDMP will work to include all municipalities within El Paso County. Future PDMP will include the following municipalities:

Jurisdiction	Hazard Mitigation Update Committee Proposed POC
El Paso County	Emergency Program Manager
Town of Palmer Lake	Town Manager
Town of Monument	Chief of Police
Town of Green Mountain Falls	Town Manager
Town of Manitou Springs	Chief of Police
Town of Fountain	Chief of Police
Town of Calhan	Fire Chief
City of Colorado Springs	Office of the Fire Marshal

Public Participation in Plan Maintenance

El Paso County also understands the importance of direct public input to the plan update effort. To facilitate public involvement of the plan's maintenance and evolution process, the working group will place copies of the plan and proposed updates will be posted to the county's website along with instructions for public participation in contributing to the maintenance process. Public meetings will be held during the planning update process where citizen comments will be collected, their concerns discussed and ideas shared. The Working Group will incorporate public ideas and comments into the plan maintenance process and adjust the plan as appropriate.

Annual Plan Review

The Plan will be reviewed by the Working Group annually or when:

- Determined appropriate by the Update Committee
- Significant changes occur within the planning area involving threat impact or potential impact
- Changes occur to mitigation actions that are part of the Plan

As part of the annual Plan review, the working group will follow a process that:

- Requests input from project stakeholders not represented on the working group, including members of the public. This input will include information on projects and programs important to mitigation planning.
- Makes minor adjustments to the plan to keep mitigation actions in line with approved goals and objectives
- Allows for a formal approval process for major changes to the Plan

Plan Review Criteria

The Working Group has defined initial criteria for evaluating the Plan, and these criteria will be modified and approved by the Mitigation Working Group as appropriate. When evaluating the Plan, the Working Group will, among other things, assess whether:

- Mitigation goals and objectives address current and expected conditions
- The nature and magnitude of threats have changed
- Current resources are appropriate for implementing the Plan
- The mitigation actions underway continue to be compatible with STAPLEE criteria and any other criteria determined relevant by the Update Committee
- The maintenance process includes a cross-functional set of participants, including members of the public and representatives of the jurisdictions involved in the Plan
- Mitigation actions encounter problems in implementation
- Mitigation actions are achieving outcomes as planned
- Mitigation actions are coordinated with other planning studies, reports and programs in effect in El Paso County and participating jurisdictions.

El Paso County's Hazard Mitigation Working Group will meet periodically to ensure that mitigation actions are incorporated into on-going planning activities. Following PDMP adoption, the Working Group will coordinate with agencies and departments within their respective jurisdictions to align mitigation actions in the PDMP to appropriate policies, plans, budgets and regulations, some of which are identified earlier in this document. El Paso County believes that this process will allow the plan to effectively address the hazard mitigation requirements within the planning area and incorporate input from a broad cross section of stakeholders, including community members.

PLAN ADOPTION

El Paso County Board of County Commissioners (BoCC) will adopt the Plan according to the BoCCs general process.

The BoCC adopted Plan will be posted to the County's Internet Website for public viewing.

Appendix A – Mitigation Goals, Objectives, and Actions for El Paso County

This appendix describes mitigation actions and associated goals and objectives for the prioritized hazards adopted by El Paso County and the participating jurisdictions within El Paso County. The hazards identified for mitigation include:

- Wildfire
- Transported Hazardous Materials (HAZMAT – Transported)
- Severe Weather
- Disease Outbreak
- Landslide/Rockslide
- Extreme Acts of Violence in Schools

Below are the goals and objectives established by the PDM Working Group. The number of objectives and mitigation actions are at the discretion of the planning team. The intent for these goals and objectives is to frame and prioritize future actions to mitigate the effects of potential disasters.

PDM GOALS AND OBJECTIVES

Goal: Reduce the probability and effect of a catastrophic Wild Land Fire

Objective: Identify those areas of the County that require WLF fuels mitigation efforts and establish programs to reduce fuel loading in those areas.

Action 1.1: Identify those areas of the county that pose significant threat of a WLF to residents due to lack of forest mitigation. (EPC OEM)

Action 1.2: Conduct forest mitigation procedures to reduce the amount of fuel loading especially in areas that have a high residential population. (EPC OEM)

Action 1.3: Increase the number of Fire Wise Communities in the County. (EPC OEM)

Action 1.4: Establish and fund a County Mitigation Officer. (EPC OEM)

Objective: Improve the ability of First Responders to reach WLF and improve their ability to fight the fire.

Action 1.1: Improve rural roads to ensure that Emergency vehicles can provide a quick response to keep WLFs small. (EPC DOT)

Action 1.2: Identify those areas that require the installation of cisterns or hydrants to assist in providing water to the fire fighters. (EPC OEM)

Action 1.3: Ensure that a County WLF emergency plan is written, approved and exercised to allow for a coordinated effort to fight a large WLF. (EPC OEM)

Action1.4: Establish a large scale evacuation plan of the WUI including a mass sheltering plan for such an incident. (EPC OEM)

Objective: Improve the ability of residents to prevent fires.

Action 1.1: Provide for public education forums to teach residents how to build "eye-pleasing" defensible space into their property. (EPC OEM/PPWWP)

Action 1.2: Provide for a public wood chipping program that allows residents to clear away trees and brush on private property. (EPC OEM/PPWWP)

Goal: Reduce the probability of a HAZMAT release and reduce the impact to residents should a release take place.

Objective 1: Identify and characterize the facilities and roads utilized for HAZMAT transportation and storage to ensure quick and safe response actions.

Action 1.1: Conduct a HAZMAT Flow Study. (EPC OEM)

Action 1.2: Hire an additional HAZMAT Technician that can be dedicated to Tier II inspections and courtesy surveys for Tier II facilities and to maintain emergency plans for HAZMAT spills. (EPC OEM)

Objective 2: Provide for improved response by the public in case of a HAZMAT release.

Action 1.1: Expand the current public education programs to include HAZMAT awareness and Shelter-In-Place (SIP) procedures. (EPC OEM)

Action 1.2: Increase the ability to contact residents in case of a HAZMAT spill to provide emergency information to residents to SIP or evacuate. (EPC OEM)

Action 1.3 Develop an evaluation plan that includes a means to notify and evacuate homeless people that reside in areas that could have a HAZMAT spill. This is especially critical along railroad tracks and near major bridges. (EPC OEM)

Goal: Minimize the impact of severe weather to County residents.

Objective 1: Upgrade and expand the flood warning system within the County to include new residential areas that are in in a designated drainage basin..

Action 1.1: Develop a strategic plan for the flood warning system. (El Paso County (EPC) Department of Transportation (DOT) and Office of Emergency Management OEM)

Action 1.2: Repair, reposition, and upgrade the existing flood warning system. (EPC DOT and OEM)

Action 1.3: Identify those drainage basins that require installation of a flood warning system sensor. (EPC DOT and OEM)

Objective 2: Reduce the effects of flooding and its impact on residents, businesses, agriculture, infrastructure, and natural areas.

Action 1.1: Develop a Strategic Plan for the Fountain Creek Watershed. (FCW TAC and Vision Task Force) (*http://www.fountain-crk.org/*)

Action 1.2: Develop projects and policies that support the recommendations of the Army Corps of Engineer Watershed Study. (FCW TAC and Vision TF)

Action 1.3: Develop future policies that encourage low impact development and will minimize the amount of flooding, erosion and sedimentation problems. (FCW Vision TF)

Action 1.4: Fund a buy-out program for those structures that are in the floodplain beginning with those that are repetitive damage structures. (Floodplain Manager and EPC OEM)

Action 1.5: Re-evaluate the 100-year FEMA floodplain of Fountain Creek, Monument Creek, and the major tributaries. (EPC Floodplain Manager)

Action 1.6: Continue to provide a public education program to inform residents about mitigation measures and means for them to protect themselves and their property during a flood. (EPC OEM/Floodplain Manager)

Objective 3: Improve tornado warning in rural areas of the county especially in high tornado- prone areas.

Action 1.1: Expand tornado warning system to include rural communities not currently possessing a tornado siren system including new residential areas. (EPC OEM)

Objective 4: Improve the traffic control on rural roads that are subject to snow drifting and white-out driving conditions.

Action 1.1: Identify hazard areas in the county. (EPC DOT)

Action 1.2: Insure that critical roads/emergency routes are identified to El Paso County DoT and CDOT to insure they remain clear during snow conditions. (EPC DOT)

Action 1.3: Maintain sufficient snowplows and drivers to support severe snow conditions in the county. (EPC DOT)

Goal: Reduce the rockslide/mudslide occurrences and impact potential to residents and their property.

Objective 1: Identify, characterize mudslide/landslide prone areas and mitigate effects to residents.

Action 1.1: Identify areas that are prone to mudslides/landslides. (EPC DOT)

Action 1.2: Stabilize or remove rocks that pose a hazard. (EPC DOT)

Action 1.3: Ensure that areas that have suffered from a Wildland Fire are properly reseeded and maintained to avoid slides. (EPC OEM)

Goal: Reduce the potential and impact of a severe act of violence in County schools or on school buses.

Objective 1: Reduce the ability of unauthorized persons to access schools and cause a severe act of violence in County schools.

Action 1.1: Conduct a risk assessment of schools in the County. (School Districts/EPC OEM)

Action 1.2: Install access control and monitoring capabilities in schools. (School Districts)

Action 1.3: Fund for School Resource Officers (SRO) in each school in the county. (EPC Sheriff)

Objective 2: Improve the ability to locate school buses and provide for a quick response for emergencies.

Action 1.1: Install GPS trackers in school buses. (School Districts)

Action 1.2: Provide education programs for bus drivers to improve their ability to act and react during emergencies. (School Districts)

Objective 3: Improve First Responders ability to respond to school emergencies. This includes the designing of new buildings to support response operations.

Action1.1: Ensure that each school has emergency procedures and plans in place for severe acts of violence. (School Districts/EPC OEM)

Action 1.2: Ensure that school plans are coordinated with local police and Sheriff's Office to ensure that the plan is supportable by local SWAT/Tactical units. (School Districts/EPC OEM)

Action 1.3: Ensure that new construction is designed to support First Responders' ability to access and support response to a severe act of violence. (School Districts)

Action 1.4: Maintain an updated plan for responding to Extreme Acts of Violence in schools. This includes active shooter, hostage, and intentional release of a Toxic Industrial Chemical (TIC). Exercise the plan annually. (EPC Sheriff and EPC OEM)

Action 1.5: Ensure that First Responders are trained in up-to-date Tactics, Techniques, and Procedures (TTPs) for responding to Extreme Acts of Violence including active shooter, hostage, and the intentional release of a TIC as a minimum. (EPC Sheriff/EPC OEM)

Objective 4: Improve the ability of teachers and school staff to act and react to acts of violence.

Action 1.1: Ensure that school personnel are trained in how to respond to acts of violence in their school. (School Districts)

Action 1.2: Ensure that schools have equipment and supplies on hand to support procedures in case of an act of violence. (School Districts)

Action 1.3: Establish a means for law enforcement and all school districts to share information on a routine as well as emergent basis. (EPC Sheriff)

Goal: Reduce disease outbreak occurrences and severity in the County

Objective 1: Provide for public education to increase awareness on how to prevent or minimize disease outbreak.

Action 1.1: Enhance awareness and preparedness of residents through a public education program. (EPC Department of Health (DoH))

Action 1.2: Allow for residents to participate in County exercises, where applicable, to educate residents and to provide residents with the knowledge of county readiness. (EPC OEM/DoH)

Objective 2: Improve the County's ability to respond to a potential or actual disease outbreak.

Action 1.1: Ensure emergency plans are approved and exercised to ensure a coordinated effort to protect residents from a disease outbreak. Plans should include Points of Distribution and medical surge capability/capacity as a minimum. (EPC DoH)

Action 1.2: Provide for education of First Responders to minimize the effects of disease on them and their families. (EPC DoH)

Action 1.3: Identify critical functions within the county and ensure that sufficient trained personnel are available to support these functions. This includes a Continuity of Operations Plan (COOP) for government officials as well as sufficient personnel to maintain public utilities, law and order, safety and critical medical support. (EPC OEM)

Goal: Insure continuity of critical services in the County

Objective: Protect Critical Infrastructure from All-Hazard.

Action 1.1: Develop plans to protect Critical Infrastructure at risk from Wildland Fire. (EPC OEM)

Action 1.2: Partner with local businesses, Chamber of Commerce, Non-Governmental Organizations (NGOs) that provide critical services to residents to insure continuity of services and a coordinated response. (EPC OEM)

Appendix B – Public Survey Example

The following represents the public survey form used to collect the public input.

El Paso County, Colorado

Pre-Disaster Mitigation Plan Development

Public Survey

Introduction

El Paso County is participating in a federally-funded effort in accordance with the Disaster Mitigation Act of 2000 to develop a **pre-disaster mitigation plan** to reduce risk from natural and human-caused hazards. The input of all County residents is sought through this public survey about possible hazards facing the County.

Your participation in this short survey is greatly appreciated and will contribute to the quality of the County's emergency planning efforts.

Respondent Name: _____

Are you 18 years old or older: (YES NO)

Please record today's date: DATE: / / 2005

If you reside in a town, which one? _____

Do you reside in unincorporated El Paso County? (YES NO)

Are you an Emergency Response Professional? (YES NO)

If so, are you a (check those that apply):

- Firefighter _____
- Law enforcement _____
- EMS _____
- Healthcare professional _____
- Mountain Rescue _____
- Other public safety _____

Multi-Jurisdictional Hazard Mitigation Plan Development

Public Survey Form

In your opinion, which of the following hazards and their potential consequences most threaten life, health and property in your community?	Please rate each hazard from 1 – 10 1 – Least threatening 10 – Most threatening

Natural Hazards *(Please circle your responses)*

Wildfire	1 2 3 4 5 6 7 8 9 10
Winter Storm	1 2 3 4 5 6 7 8 9 10
Seasonal Flooding (seasonal rains, melting snow)	1 2 3 4 5 6 7 8 9 10
Flash Flooding (caused by high run-off due to excessive rain and drainage failure)	1 2 3 4 5 6 7 8 9 10
Landslides	1 2 3 4 5 6 7 8 9 10
Avalanche	1 2 3 4 5 6 7 8 9 10
Drought	1 2 3 4 5 6 7 8 9 10
Tornado	1 2 3 4 5 6 7 8 9 10
High Winds	1 2 3 4 5 6 7 8 9 10
Lightning/Thunderstorms	1 2 3 4 5 6 7 8 9 10
Earthquake	1 2 3 4 5 6 7 8 9 10

Human-Caused Hazards *(Please circle your responses)*

Flood due to Dam Breach	1 2 3 4 5 6 7 8 9 10
International Terrorism	1 2 3 4 5 6 7 8 9 10
Domestic Terrorism	1 2 3 4 5 6 7 8 9 10
Transportation of Hazardous Materials	1 2 3 4 5 6 7 8 9 10
Fixed Installations of Hazardous Materials	1 2 3 4 5 6 7 8 9 10
Urban Fire (Accidental)	1 2 3 4 5 6 7 8 9 10

Airplane Crashes	1 2 3 4 5 6 7 8 9 10
Military Accident	1 2 3 4 5 6 7 8 9 10
Arson	1 2 3 4 5 6 7 8 9 10
Extreme Acts of Violence	1 2 3 4 5 6 7 8 9 10
Civil Disturbance	1 2 3 4 5 6 7 8 9 10
Motor Vehicle Crashes (single vehicle)	1 2 3 4 5 6 7 8 9 10
Motor Vehicle Crashes (multiple vehicles)	1 2 3 4 5 6 7 8 9 10
Jail Escape	1 2 3 4 5 6 7 8 9 10

Other Hazards – Natural or Human-caused (please write in relevant hazard)

	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10

Appendix C – SCR Risk Assessment

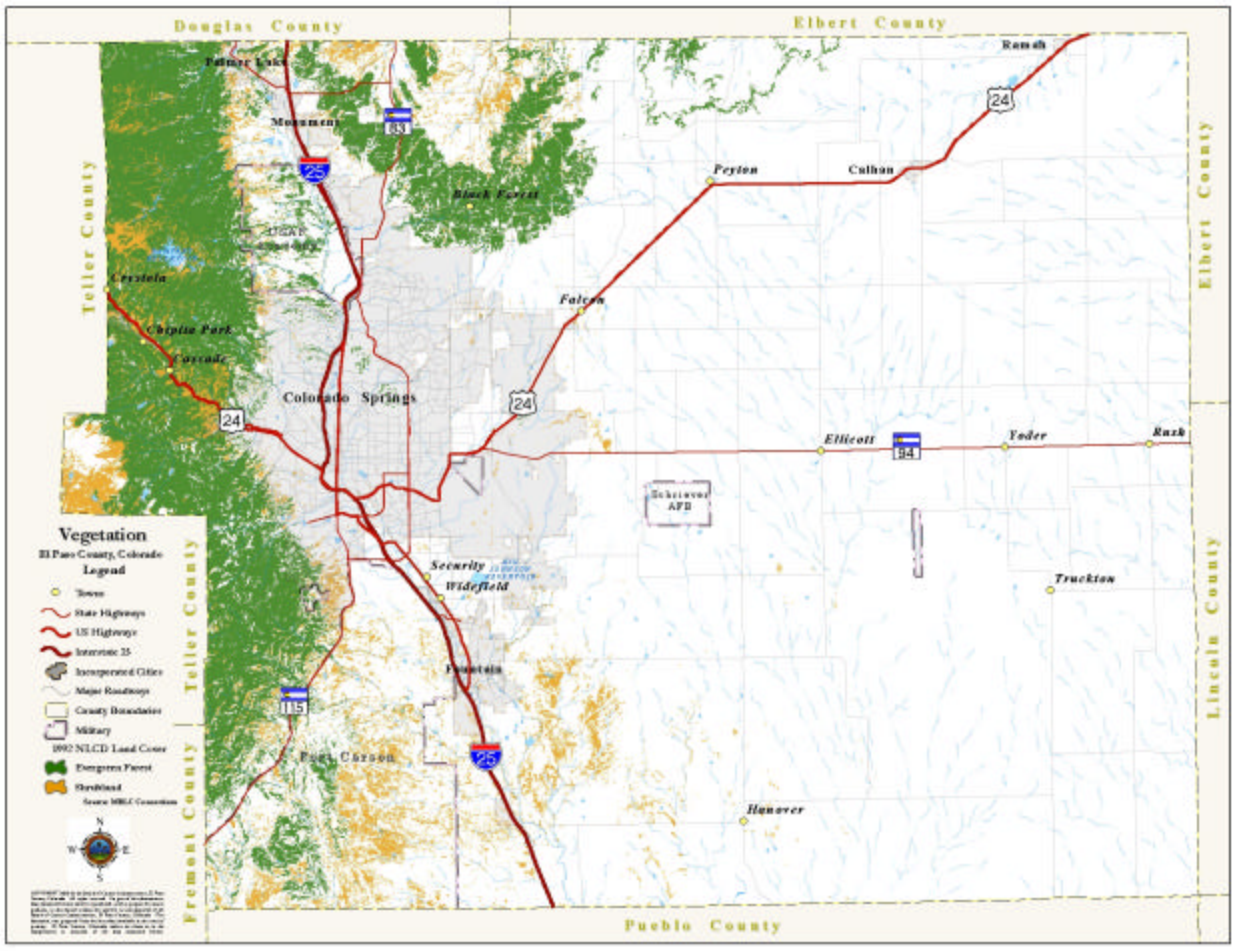
During 2006 and ending in 2007 the South Central Region conducted a Risk Assessment of the region. This assessment looked at all hazards and determined which hazards posed the most risk to the Region. The criteria was similar to that of the FEMA STAPLEE but also included a look from a regional basis as capabilities are procured and strategically placed in the region to support all 6 counties. Another factor that was considered was cross-boundary concerns in which an event that was initiated in one county would ultimately affect another. The primary focus for analysis was the hazard list and prioritization of El Paso County, Teller County and the City of Colorado Springs. Due to the proximity of these two entities to El Paso County, and the hazards associated with each, an incident in either Teller County or Colorado Springs could, and most likely will, cause subsequent effects to El Paso County. The result of that risk assessment is on the next page.

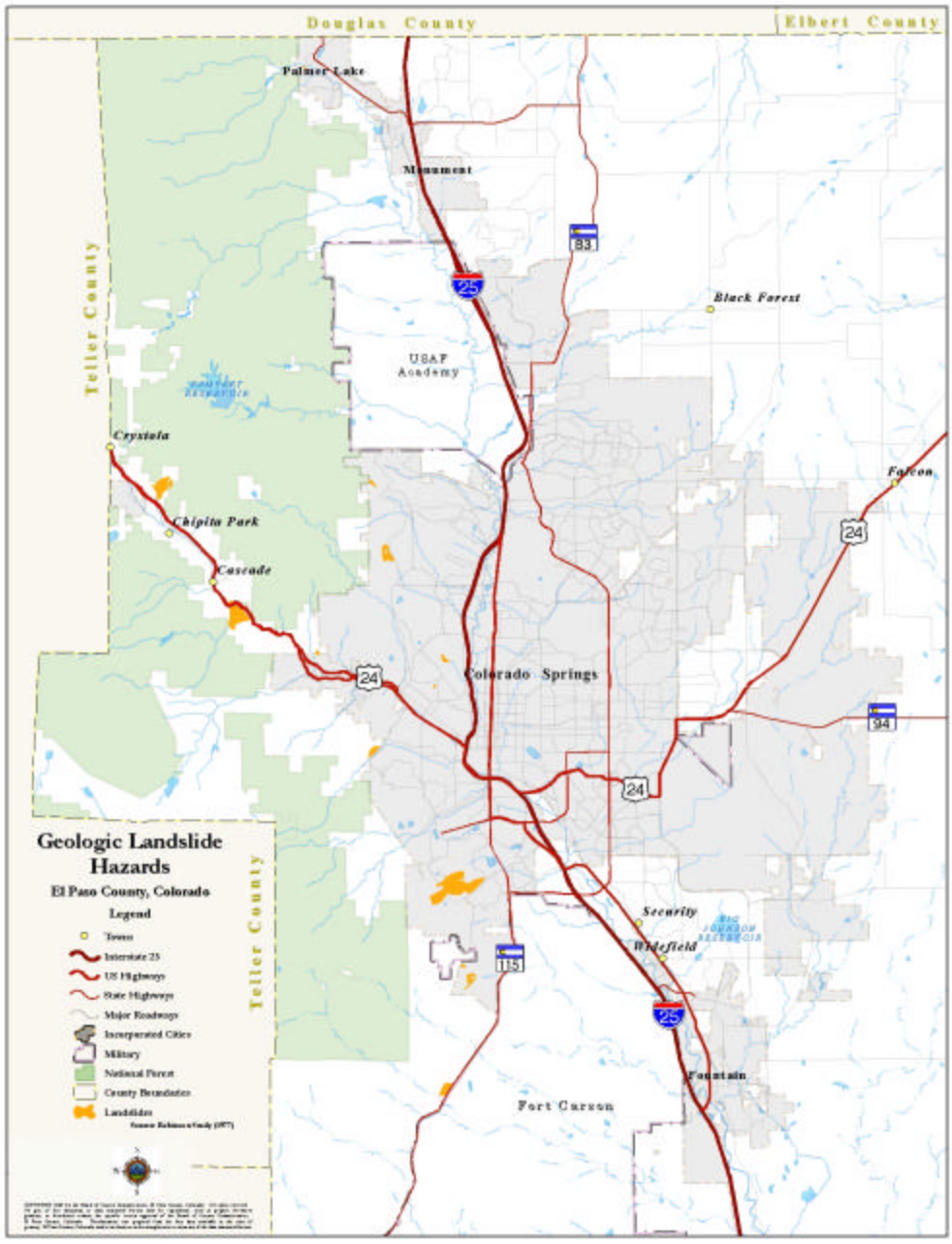
				SCR RISKS						
	Chaffee	Col. Springs	El Paso	Park	Teller	Lake	Votes	Score	OML	
HAZMAT Transport	3		6	4	6	8	5	28	1	HAZMAT Transpo
Winter Storm	2	5	2	7			4	28	2	Winter Storm
Flood		2		2	2		3	27	3	Flood
Transportation Disrupt.	7	9	1	9	5		5	24	4	Transportation Di
Population Influx	9	7		1	4		4	23	5	Population Influx
Public Health	10	1	5			6	4	22	6	Public Health
Large Pop. Venue	5	4	9	6			4	20	7	Large Pop. Venue
Fire Wild Land, Major				5	7	1	3	20	8	Fire Wild Land, M
Fire Residential	4					4	2	14	9	Fire Residential
Landslide	1			10	10		3	12	10	Landslide
Civil Unrest	8	10		3			3	12	10	Civil Unrest
Airplane Accident		6	4				2	12	12	Airplane Accident
HAZMAT Fixed		3			8		2	11	13	HAZMAT Fixed
School Bus	6		8		9		3	10	14	School Bus
Power Plant/Utilities			7			5	2	10	15	Power Plant/Utilit
Fire Urban Interface					3	9	2	10	15	Fire Urban Interfa
Dam Failure					1		1	10	17	Dam Failure
Refugee Overflow						2	1	9	18	Refugee Overflow
Tornado			3				1	8	19	Tornado
Mass Casualty Event						3	1	8	19	Mass Casualty Ev
Fuel Storage			10	8			2	4	21	Fuel Storage
Mine Drainage						7	1	4	22	Mine Drainage
Airport Incident		8					1	3	23	Airport Incident
Drought						10	1	1	24	Drought
as of 262145Sep										

Appendix D –Hazard Maps

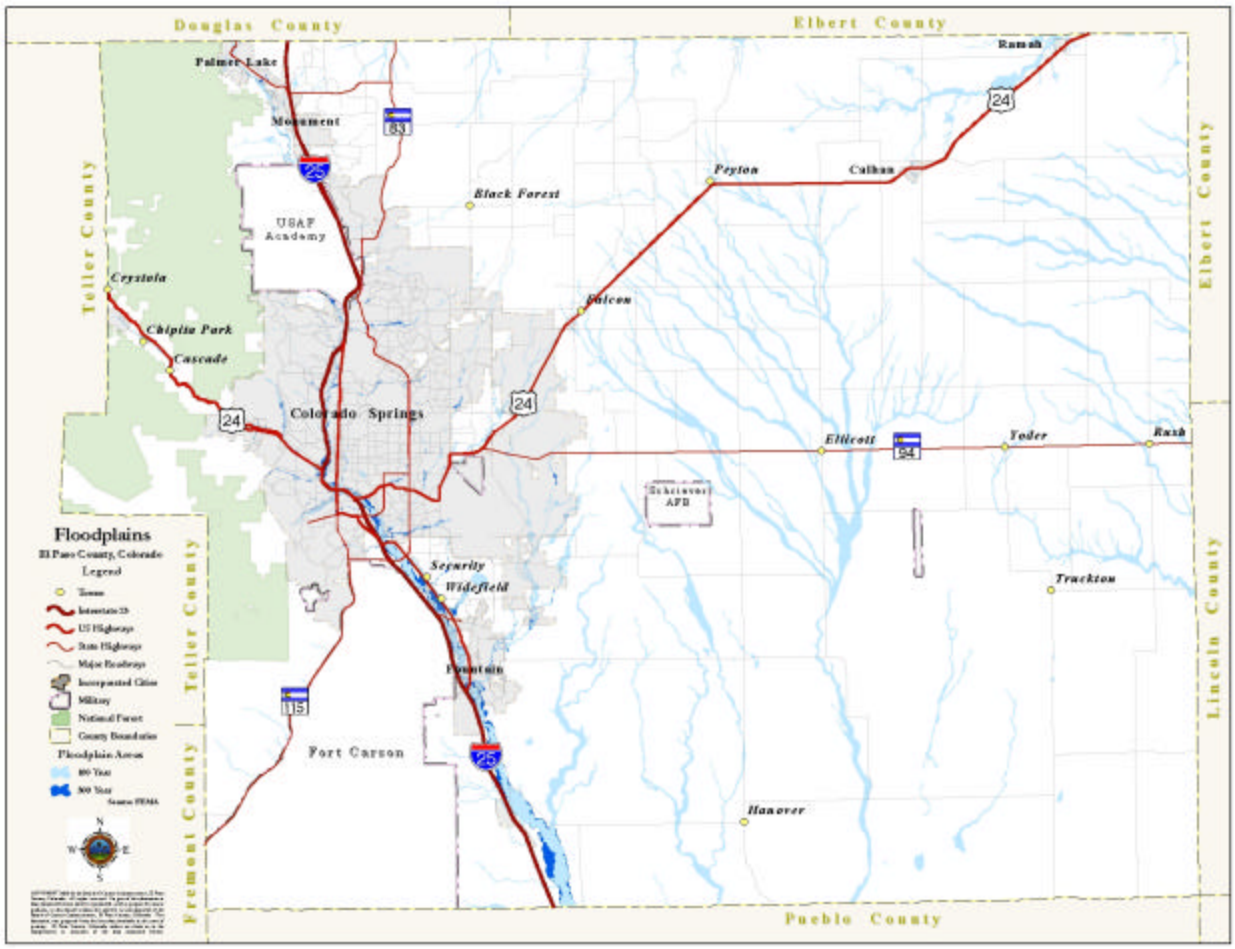
The following are the hazards maps that were utilized by the County during the planning process of the PDM:

Map Depicts Vegetation That Is Highly Prone to Wildland Fire




Douglas County
Elbert County
Palmer Lake
Monument
Teller County
Black Forest
USAF Academy
Crystola
Chipita Park
Cascade
Falcon
Colorado Springs
Security
Widefield
Fountain
Fort Carson
Geologic Landslide Hazards
El Paso County, Colorado
Legend
Towns
Interstate 25
US Highways
State Highways
Major Roadways
Incorporated Cities
Military
National Forest
County Boundaries
Landslides

Map Depicts The Flood Plains Within El Paso County

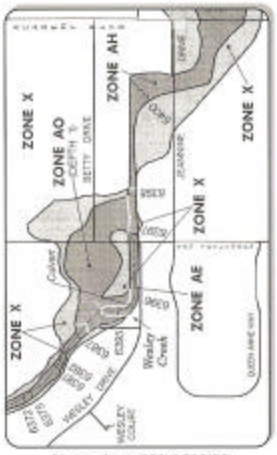


The Flyer Behind is a Sample of the Most Recent Flood Information Provide to the Public

Flyer: Page 1

The natural func nd benefits of floodplains in this region include storage areas for floodwaters, storm water purification, wetlands and grazing areas of wildlife. Not only do these areas reduce potential flood damage, but also preserve the natural beauty of the Pikes Peak Region. Bear Creek Park, Green Mountain Falls Town Park, Schryver Park in Manitou Springs, Monument Lake and Fountain Creek Regional Park are examples of natural areas that benefit the community by protecting and enhancing the quality of life.

Maps of flood hazards are available at the Penrose Public Library, Pikes Peak Regional Building Department or on-line at www.fema.gov



Portion of map 08041C0519F

Regional Floodplain Management Office
Pikes Peak Regional Building Department
2880 International Circle, Colorado Springs, CO 80910
Telephone: 719-327-2907 • www.ppbd.org

PRSRT STD
U S POSTAGE
PAID
COLO SPGS, CO
PERMIT NO. 380

Regional Floodplain Management Office
Pikes Peak Regional Building Department
2880 International Circle, Colorado Springs, CO 80910

PROLONGED OR HEAVY RAINFALL CAUSES MOST FLOOD EVENTS IN EL PASO COUNTY

JUNE 2 - 7, 1921 – Shooks Run, Sand C and Fountain Creek flooded.

MAY 27, 1922 – Eastern Colorado Springs and Templeton Gap Basin flooded.

JULY 27 - 30, 1932 – Flooding in Templeton Gap Basin, Cottonwood Creek, Fountain Creek, and northern Colorado Springs.

MAY 31, 1935 – Monument Creek flooded within one hour, killing 4 people and causing $1.2 million in property damage (equal to $16.1 million, today).

JUNE 1965 – 14 inches of rainfall in 15 days. Significant flooding.

JUNE 17, 1993 – Flash flooding, and Fountain Creek overflowed.

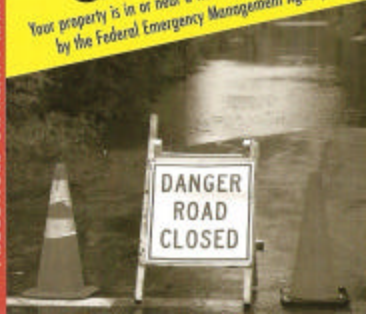
APRIL - MAY 1995 – Black Squirrel Creek spilled over railroad tracks, damaged creek bed and 40 roads; 24 roads were closed.

JULY 30, 1998 – Heavy rain impacted Security and Widefield communities.

MAY 1999 – National Disaster was declared after flooding in El Paso County. Infrastructure damage at over 80 sites in El Paso County. As much as 14.5 inches of rain fell in less than 48 hours (compared to average annual precipitation/rainfall of 17 to 19 inches). Over $30 million in damages.

CAUTION

Your property is in or near a flood hazard area mapped by the Federal Emergency Management Agency.



Flyer: Page 2

PROTECTIN[illegible]OPERTIES BEFORE A FLOOD

Flood Insurance Is Available For Property Owners & Renters

Your property is located in or near a flood hazard area as mapped by the Federal Emergency Management Agency (FEMA). If a house is located within the FEMA regulated floodplain, there is a 26% chance that the structure will be inundated by a 100-year flood event during the course of a 30-year mortgage. Standard insurance policies typically do not cover damage from flooding. Because your jurisdiction participates in the National Flood Insurance Program (NFIP), flood insurance is available for all properties, including those damaged previously by flooding. Coverage must be in effect at least 30 days prior to a flooding event. There are two types of coverage: structural and contents. Be sure to check with your insurance agent for more detailed information on flood insurance. Information is also available on FEMA's website at *www.fema.gov/business/nfip*

Mitigation Measures To Protect Property

Flood protection measures vary in required expense and expertise. Benefits depend on the individual property, structure and the depth of 100-year flood levels at the site. Some examples of mitigation measures include lot grading, constructing a waterproof veneer to exterior walls, and elevating the heating, ventilation and cooling systems and electrical system components. Before beginning such a project, call the Floodplain Management Office at 327-2907 to discuss permit requirements.

Property Improvements Or Reconstruction

New construction, alteration to any structure, and land modifications, such as excavation, dredging, filling or landscaping, require a review and permit issued by the Floodplain Management Office. Improvements that exceed 50% of the current market value are required to meet NFIP regulations for new construction. This also applies to substantially damaged structures, regardless of the source of the damage. New construction requires that the lowest floor, including the basement, have an elevation of at least one foot greater than the 100-year flood depth. Construction plans submitted to Regional Building Department will be reviewed to insure compliance with local and federal floodplain codes.

Personal Safety Preparation

Plan an escape route to higher ground that avoids streams, waterways and known flooding areas. Be aware of potentially dangerous flooding areas near your home, work, shopping and mountain outings. Have ready for use a battery powered radio and fl[illegible] with extra batteries. Report any debris or blockage in drainage culverts or streams to the appropriate maintenance agency listed on this brochure. Unreported blockages in culverts or streams can impede water flows and result in greater property damage.

PROTECTING LIVES DURING A FLOOD

Flood Monitoring & Warning Systems

The Floodplain Management Office of Pikes Peak Regional Building Department established a flood monitoring system in the 1980s. Now maintained by El Paso County, the system includes 60 sensors on 48 sites. The sensor information is communicated to emergency management agencies and television and radio stations that broadcast "flash flood watch" alerts of weather conditions that may result in flooding. When an "urban and small stream flood advisory" is issued, be watchful of streams for fast developing flash flooding. Avoid traveling near those areas. When a "flash flood warning" is issued, immediately leave the flood hazard area for higher ground.

Deadly Currents In Shallow Water, Washed Out Roads & Bridges

Do not attempt to walk or drive through flowing water. Drowning is the number one cause of flood deaths, particularly during flash floods. Don't underestimate the speed of flood waters. Six inches of flowing water can sweep a person off their feet and 2 feet of rushing water can carry away most vehicles. Avoid power lines and electrical wires. Second to drowning, fatalities during floods are caused by electrocution. Electrical current can travel through water. Report downed power lines to the utility company and 911. If your home is in danger or is being flooded, leave immediately and then contact the utilities company to turn off electricity and gas connections.

PROTECTING LIVES AFTER A FLOOD

Returning To Your Property

Be cautious when returning to your home or business after a flood. Return home only when authorities indicate it is safe. Be aware of areas where floodwaters have receded. Roads may have been weakened and could collapse under the weight of a car. Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations. Listen for news reports to learn whether the community's water supply is safe to drink. Gas leaks should be reported immediately to the utilities department. Do not smoke or use candles, lanterns or any other type of flame when there is a potential gas leak.

AGENCY PHONE NUM[illegible]RS

FLOOD RISK, CONSTRUCTION, LAND MODIFICATION
Regional Floodplain Management 327-2907
Floodplain Information Online www.pprbd.org
Colorado Water Conservation Board 303 866-4805
Army Corp of Engineers (Pueblo) 719-543-9459

EMERGENCY MANAGEMENT
Colorado Springs Office 385-5957
El Paso County Office 575-8400
Emergency 911

DRAINAGE FACILITY REPAIR/MAINTENANCE
Colorado Springs Streets Division 385-5934
El Paso County Dept. of Transportation 520-6460
Fountain City Hall 382-8521
Green Mountain Falls Town Hall 684-9414
Manitou Springs Streets Dept. 685-5596
Monument Public Works Dept. 481-2436
Palmer Lake City Hall 481-2953

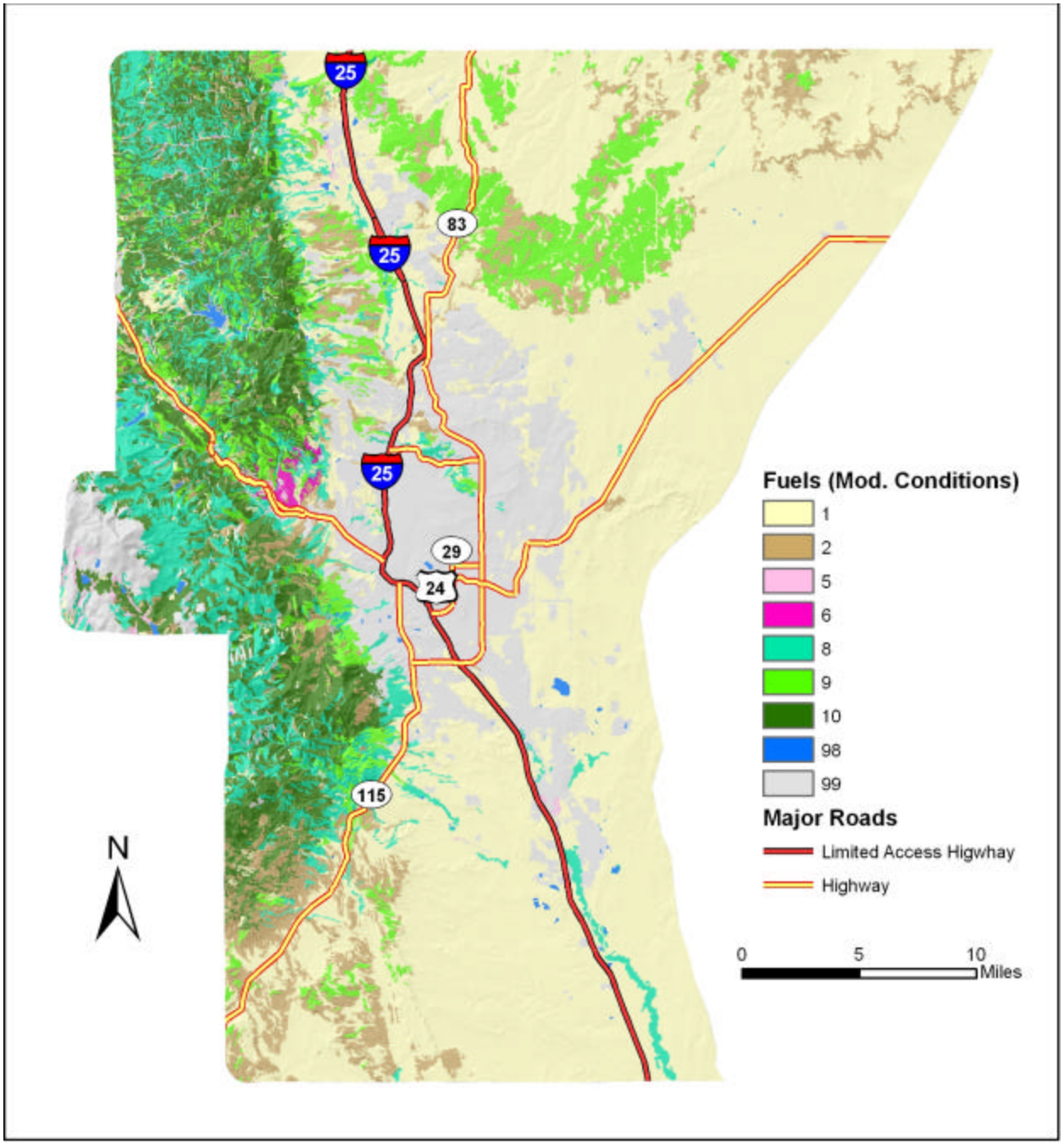
ARE YOU AWARE?

Pikes Peak Regional Building Department's Floodplain Management Office works with the Federal Emergency Management Agency, National Flood Insurance Program, and local and state agencies to reduce risks to lives and properties in Floodplains. The Floodplain Management Office serves Colorado Springs, Fountain, Green Mountain Falls, Manitou Springs, Monument, Palmer Lake and unincorporated El Paso County.

The office maintains maps and a database that identifies properties in a mapped floodplain, assists property owners in preventing potential flood damage, reviews plans and issues permits for construction and land modifications in designated floodplains. It retains FEMA Elevation Certificates and promotes public safety measures. The office investigates complaints of floodplain regulation violations, such as property and structural changes without a permit, and dumping or altering stream channels and drainage culverts--both are strictly prohibited. Report violations to the Floodplain Management Office, El Paso County Department of Transportation or the public works department of the specific jurisdiction.

The Maps Behind Depicts The Wildland Urban Interface Within El Paso County

Maps are available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903. (719) 575-8401.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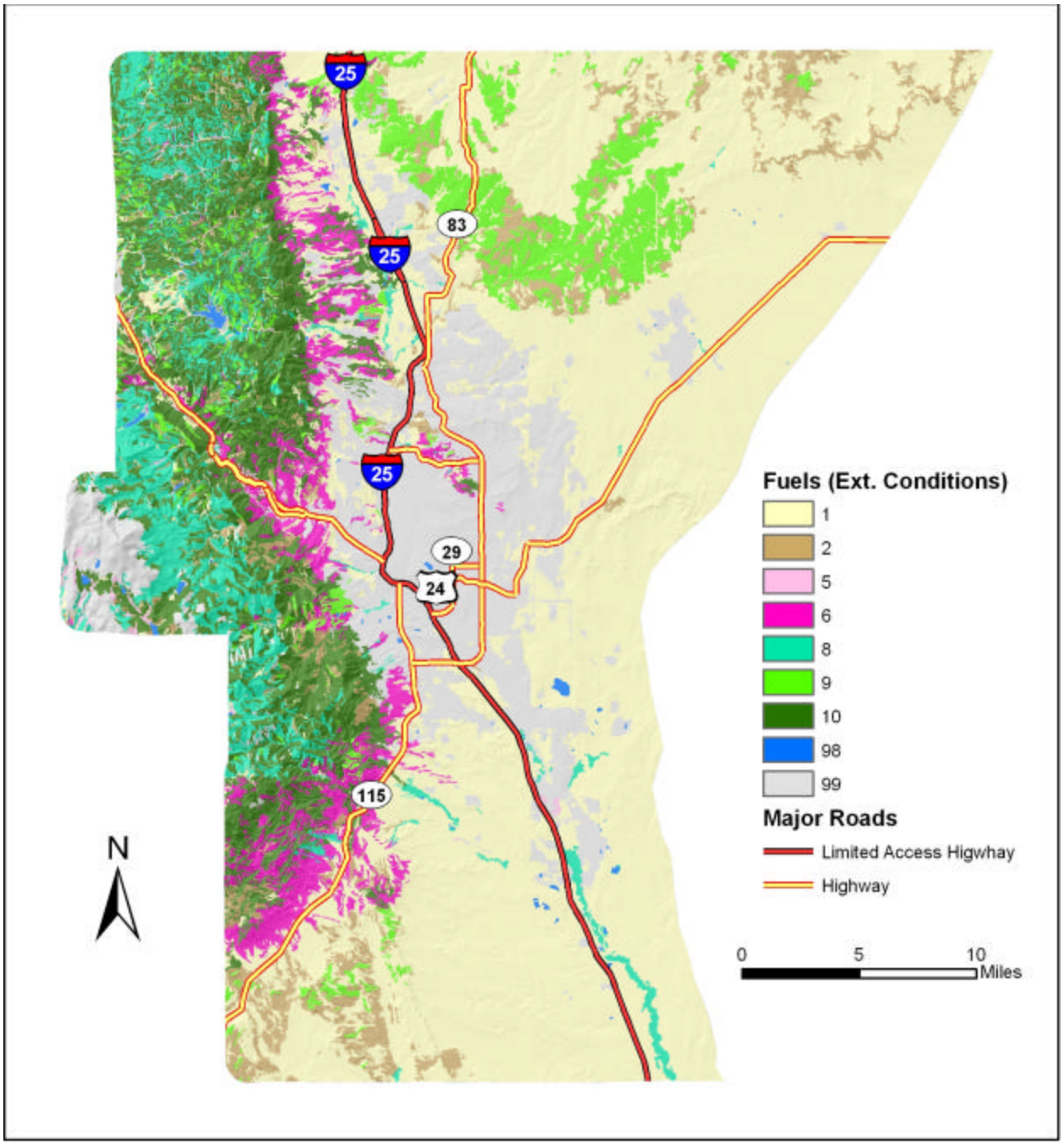
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9
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98
99
Major Roads
Limited Access Higwhay
Highway
0
5
10
Miles

The Map Behind Depicts the Hazardous Material Routes Within El Paso County

Map is available at the Office of Emergency Management for El Paso County (101 West Costilla St, Colorado Springs, CO 80903 (719) 575-8401.